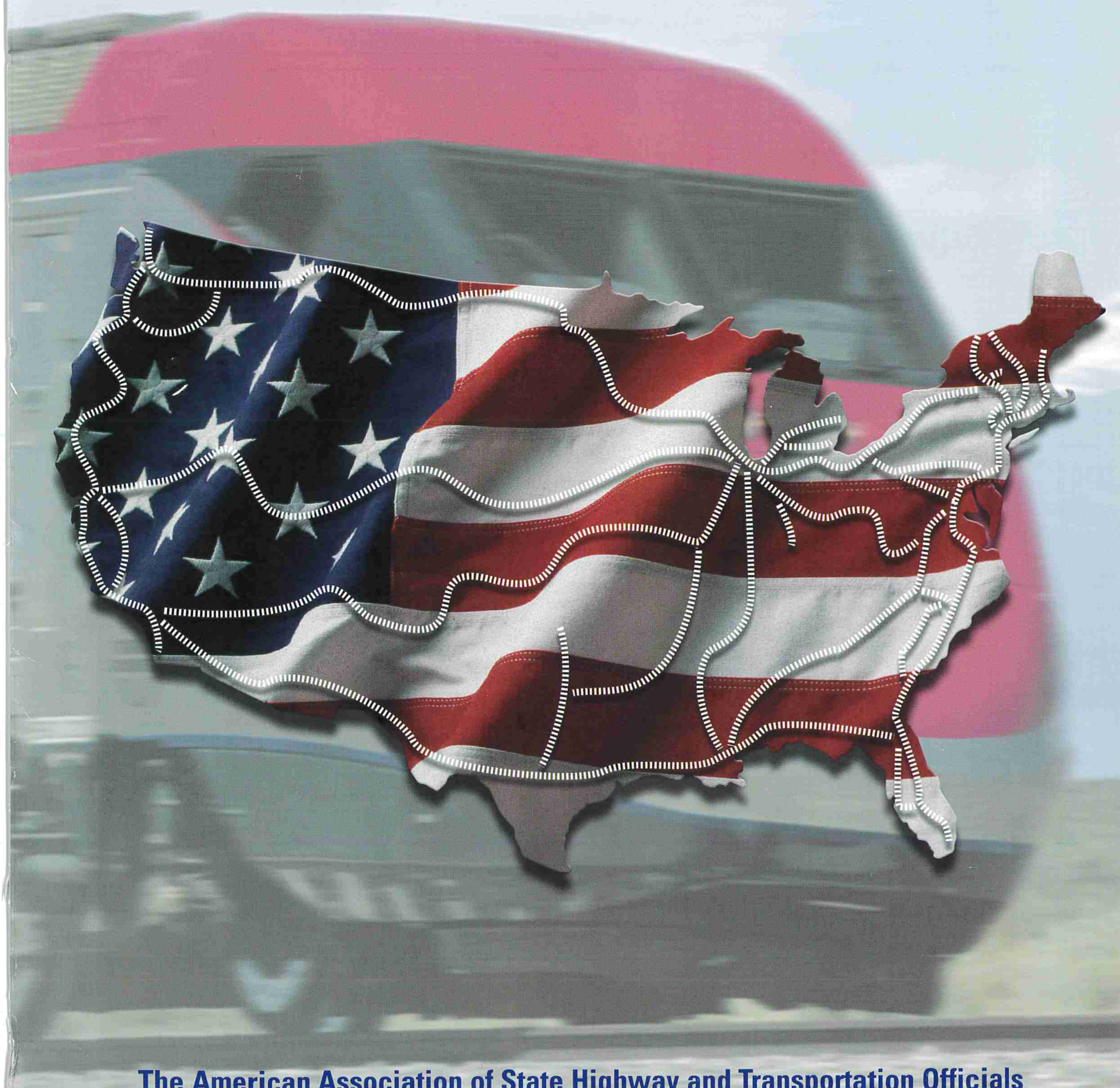
# Intercity Passenger Rail Transportation

## Standing Committee on Rail Transportation



The American Association of State Highway and Transportation Officials

# Intercity Passenger Rail Transportation

## Standing Committee on Rail Transportation

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**The American Association of State Highway and Transportation Officials**

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# READER'S NOTE

This report addresses the public benefits and investment needs of intercity passenger rail transportation. AASHTO has published an investment needs report for highways and transit and will shortly publish a report on freight rail investment needs. The cost estimates for intercity passenger rail investment presented in this report were developed independently from those presented in the freight rail report. In combination, these reports provide a complete picture of the benefits of the various surface transportation modes to the nation and the value to be realized by both the traveling public and shippers through strategic investments.

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# Preface

**Joseph H. Boardman, Commissioner**
**New York State Department of Transportation**
**Chairman, Standing Committee on Rail Transportation**
**American Association of State Highway and Transportation Officials**

This report addresses intercity rail passenger service in the United States and its role in our transportation system and economy, as well as its future. Rail passenger service does not exist in a vacuum. It is one element of a large and complicated multimodal transportation system. If that system is well-integrated and functions efficiently, it ties our communities together and links our citizens and economic output to the rest of the nation and the rest of the world. Without an effective transportation system, we pay the price of isolation and bear the costs of lost opportunities in the growing and increasingly integrated world economy.

What some have argued for a long time, became clear to many others on September 11, 2001. Rail passenger service provides much needed capacity and redundancy to the transportation system. When the aviation network was shut down, rail service was operational as early as the evening of that tragic day. In the succeeding weeks and months passenger rail has become more attractive as a regular means of transport as the aviation system struggles to adjust to the delays resulting from new security measures. In normal times passenger rail service was important. In the "new normal" times it is critical.

One of the priority items in the 2002 Action Agenda of the American Association of State Highway and Transportation Officials is a call for "legislation ensuring that the nation's travelers will have efficient and dependable intercity passenger rail service." AASHTO believes that intercity passenger rail service is a basic element of the nation's multimodal transportation system, relieving highway and airport congestion in a safe, environmentally responsible way. AASHTO recommends that such legislation do the following:

- Establish a solid basis for passenger rail service partnerships between the states and the federal government;
- Ensure the level of federal involvement necessary for financing and system integrity;
- Provide a stable system for funding rail passenger operating costs; and
- Create a dedicated, sustainable source of funding for intercity rail passenger infrastructure improvements.

The purpose of this report is to provide a foundation of fact for making good decisions on these issues. The report provides basic information about current and projected intercity passenger rail service in the United States, addresses the interrelationships with highway and air travel, including opportunities for intermodal connectivity and integration, and characterizes the value of investments in passenger rail service to our society, including the impacts on the economy and quality of life. It also identifies important institutional and policy issues for further consideration and *provides detailed information on state rail initiatives.*

While Amtrak's financial struggles have focused attention on the problems of intercity passenger rail, this report focuses on the promise of rail, and the challenges that must be confronted to fulfill it. Importantly, this report is about intercity passenger rail, not Amtrak, although, necessarily, Amtrak plays an important role in the story.

The nation must continue to invest in the national rail system, and continue to provide national intercity rail passenger service in corridors and on long-distance routes. As a component of our nation's transportation network, intercity passenger rail serves a vital public purpose as surely as the interstate highway system or the national aviation network. It is not in competition with these modes, but complementary. All will function most effectively if they function in concert. Preservation and enhancement of rail passenger service is thus, a public responsibility. The history of passenger rail service in this country has led some to think of it as essentially different from other modes of transportation that serve the public. As a result, some think that rail service must be profitable to justify its existence. It certainly must be financially viable, but judging passenger rail strictly on its financial performance or its success in minimizing financial demands on the federal government is a test no other mode of transportation is asked to meet, nor can meet.

This report documents the fact that the states are willing and committed partners in the provision of quality intercity rail passenger service. However, states can not carry the burden alone. A key factor in providing efficient passenger rail service will be the availability of adequate, predictable funding. The federal government, *appropriately,* invests billions of dollars each year in other critical transportation systems in partnership with state governments. Similarly, *it* must be a strong financial partner with states in the provision of future rail passenger service, without draining funding from other modes.

It is the expectation that this study will be useful in shaping and informing the national dialogue on the future of passenger rail service. It documents that states have been leaders in the development of passenger rail service—to a degree surprising even to those of us who are involved deeply—and it demonstrates that states most certainly will be important in the future delivery of rail service.

The commitment of the states to the future of intercity passenger rail transportation is demonstrated by the decision of the AASHTO Standing Committee on Rail Transportation to fund this report as a joint venture reflecting a consensus view of the

member states. In a time of budget constraints the following states made this report possible by their funding commitments: California, Connecticut, Florida, Maryland, New Jersey, North Carolina, Oklahoma, Ohio, Pennsylvania, Vermont, Washington, and Wisconsin.

Many people have worked very hard to make this report as good as it is. Bruce Williams led the AECOM Consulting team that drafted the report that included Chad Edison, David Ewing, Bill Gallagher, and Toni Horst. Rick Peltz, the Vice-Chairman of the AASHTO Standing Committee on Rail Transportation and Deputy Secretary for Local and Area Transportation with the Pennsylvania DOT, delivered his usual energy, enthusiasm, and common sense to the enterprise.

Randy Wade, Wisconsin DOT, was especially valuable in providing the initial shape and direction to the report and helping to maintain the momentum. Others in the Review Group that shepherded the report home included Ken Uznanski, Washington DOT; Ron Adams, Wisconsin DOT; and Steve Hewitt, Steve Slavick, and Lynn Weiskopf with the New York DOT. What makes this report especially valuable is the active involvement of the rail officials from a large number of state departments of transportation. They are noted in the acknowledgements preceding the body of the report. My apologies to anyone who is not specifically acknowledged, but readers should know that the view of intercity passenger rail service presented in this report is the result of the effort of a large, high-quality, and deeply committed team.

# Executive Summary

Increasingly severe congestion in the highway and air transportation systems has caused states to search for ways to augment the capacity of these modes. To this end, a number of states, beginning as early as the 1970s, have invested in intercity passenger rail service. These investments have yielded striking successes in the past decade and the experience has demonstrated that passenger rail can be a viable and cost-effective way to provide intercity corridor mobility in the face of increasing congestion in other modes.

This report provides an overview of intercity passenger rail service in the United States, summarizing the characteristics of the current system, reviewing the relevant history, and projecting future plans. The report describes the approaches states have used to advance intercity passenger rail service and the lessons they have learned. It documents past state investments and presents projections of future investment. It aggregates state estimates of investment needs to the national level to establish the cost of realizing the benefits of efficient and dependable intercity passenger rail service and to support the case for dedicated, sustainable, federal funding.

Nearly all intercity passenger rail service is operated by the National Railroad Passenger Corporation (Amtrak).[1] Most of this service is part of the "basic system" that Amtrak operates nationwide. In addition, a number of states have contracted with Amtrak to operate additional state-supported intercity passenger rail services. The map on the next page identifies the 13 states that currently fund state-supported Amtrak services.

Intercity passenger rail transportation services are currently provided throughout a network of about 23,000 miles of rail over which 267 trains operate per day (excluding commuter trains) serving more than 500 communities in 47 states. Intercity passenger rail transportation serves about 23 million passengers annually, generating annual ticket revenue of about $1.1 billion.[2]

The map also displays two distinct types of intercity passenger rail transportation services:

- "Corridor" services, that focus on shorter distance markets where intercity passenger rail can offer a "reasonable" travel time transportation option, and
- "Long-distance" services, that focus on longer-distance markets where rail travel times can be very lengthy.

1 Intercity passenger rail service is also provided on the Alaska Railroad, owned by the state of Alaska.

2 Total of Amtrak and Alaska Railroad annual data.


**Figure 1. The National Passenger Rail Network**

The matrix below summarizes important differences between the travel markets served and services provided by corridor and long-distance trains.

Ridership on corridor routes has grown by more than 26 percent over the past five years. Over this same time period, long-distance routes have actually experienced about a three percent decline in ridership.

Intercity travel within corridors is growing and significant. It is also increasingly multi-modal—different geographic markets and travelers are served by a range of other modes of travel, including air, auto, rail. Intermodal connections are also important in gaining maximum efficiency from the individual modes and providing key linkages between corridor markets and the rest of the world.

### Table 1. Characteristics of the Rail Market

| | Corridor | Long-Distance |
|---|---|---|
| **Market** | Under 500 miles<br>Several hours<br>Transportation<br>Frequent travel<br>Important business travel segment | 500+ miles*<br>Many hours/days<br>Transportation and travel experience<br>Less frequent travel<br>Mix of personal and leisure travel |
| **Service** | "Seat" service | "Seat" and "sleeper" service |
| | Travel time (speed)<br>Frequency (number of departures)<br>Reliability (on-time performance) | Departure/arrival time of day<br>On-board services<br>Reliability (on-time performance) |
| | High-speed rail (*Acela*)<br>Conventional speeds<br>Coach and business/first class<br>Snack/beverage service | Conventional speeds<br>Coach and sleeping car<br>(Viewliner, Superliner)<br>Lounge car/dining car |

* Long-distance trains also serve shorter-distance markets. In such cases, long-distance trains can be thought of as a string of shorter-distance services. Long-distance routes also connect corridors.

As described above, corridor markets typically include travel between points less than 500 miles apart. Such trips dominate intercity passenger travel within the United States—about 81 percent of all intercity passenger trips (greater than 100 miles) are less than 500 miles. Corridor trips have many of the following characteristics:

- Typically short distances/travel times
- Often frequent/regular travel
- Significant business travel market
- Many single-day round trips

As noted above, intercity passenger rail travel in corridors has experienced strong growth in recent years. This growth reflects a combination of market growth and increased service and investment in selected intercity passenger rail corridors. Throughout the United

States intercity passenger rail offers several advantages in serving corridor markets, including:

- Direct service to and from densely developed central cities, which may otherwise involve:
  - Travel on congested highways and parking challenges, or
  - Long, unreliable access trips to and from airports located in suburban areas.
- Providing service to and from communities not served by air.
- Use of existing rail rights-of-way, many of which are currently underutilized (unlike most highways and corridor airports).
- Scalable capacity that can more quickly respond to growth and better match seasonal and day-of-week fluctuations in demand, provided that equipment is available to provide additional service.

In addition to its role as an alternative to other modes of travel, intercity passenger rail provides an increasingly important intermodal link. Existing and proposed station—airport links in the Northeast and Midwest are important elements of corridor development in these regions. Dedicated feeder bus links extend the reach of passenger rail service into communities that cannot be economically served directly by rail, as demonstrated best by the extensive network in California.

There are many reasons for pursuing a corridor-focused passenger rail development program, including:

- *The large share of intercity passenger travel that is concentrated in relatively short trips of less than 500 miles*—Over 80 percent of all trips exceeding 100 miles in length are less than 500 miles.
- *The relative efficiency of rail in serving highly congested markets that require long drives or short flights*—Corridors with average speeds that are faster than driving can provide an effective alternative to both automobile and air service in markets between 100 and 500 miles. Congested highways can make automobile travel both unpredictable and arduous. Relatively short air flights may not be time-competitive due to the significant time requirements for transportation to and from the airports, as well as for check-in. In addition, many airports are capacity-constrained, and could be more effectively utilized if some short flights could be replaced with high-speed corridor development.
- *The many success stories upon which to base future development and planning*—Both the public and private sectors are most interested in investing in intercity passenger rail when and where there is a proven history of the market responding to past investments. These include:
  - The *California Corridors,* supported by the largest state-led corridor-development program in the United States, providing improvements to the rail infrastructure and new equipment.

- *Pacific Northwest Corridor,* where a partnership of Amtrak and Washington state has purchased new equipment for corridor service.
- *Northeast Corridor,* where federal and state investment have provided significant improvements to the rail infrastructure and Amtrak has purchased new high-speed rail equipment.
- *Empire Corridor,* where New York state and Amtrak have partnered in developing a number of infrastructure improvements, including direct access to Penn Station in New York City.
- *Washington–Richmond* and *Raleigh–Charlotte Corridors,* where state and private investment have combined to improve infrastructure serving long-distance, corridor, and commuter services.

• *The many potential economic benefits fostered through a corridor-focused strategy*—Corridors link metropolitan economies that have particularly close economic ties. Over 80 percent of the nation's population now lives in a metro area. Intercity passenger rail has the potential to accommodate growth and enhance regional economic competitiveness. Potential benefits include:
  - Direct Employment Benefits Due to Service Expansion
  - Visitor Expenditures and Tourism
  - Station/Terminal Development Impacts
  - Government Revenues
  - Amenity Gains (including needed capacity in congested highway corridors, fewer accidents, and reduced pollution emissions)

At the same time, long-distance train service should not be ignored. The long-distance passenger market, as defined in this report, is served by trains traveling distances greater than 500 miles, and operating with sleeping cars when traveling overnight. Although some corridor services provide end-to-end train journeys exceeding 500 miles, long-distance trains are set apart by their much longer average passenger trip length.

While long-distance trains may provide service in corridor markets, their schedule is often oriented around the needs of the endpoint passenger. They are generally scheduled to serve major cities and tourist destinations at attractive times, but most markets are limited to one round trip per day, or even less than daily service. In spite of these limitations, long-distance trains serve a basic transportation role in many markets throughout the United States. This includes important markets that are not served by corridor trains as well as markets where long-distance trains supplement corridor train services by providing additional round trips at key times of the day.

Long-distance ridership makes up about 17 percent of Amtrak's total. However, these long-distance passengers travel about 50 percent of Amtrak's total passenger miles.[3] Since fiscal year 1996, Amtrak's long-distance trains have not seen ridership growth comparable to Corridor trains. This results in part from the elimination of several routes and insufficient equipment availability during periods of peak demand.

3 A passenger mile is one passenger traveling one mile.

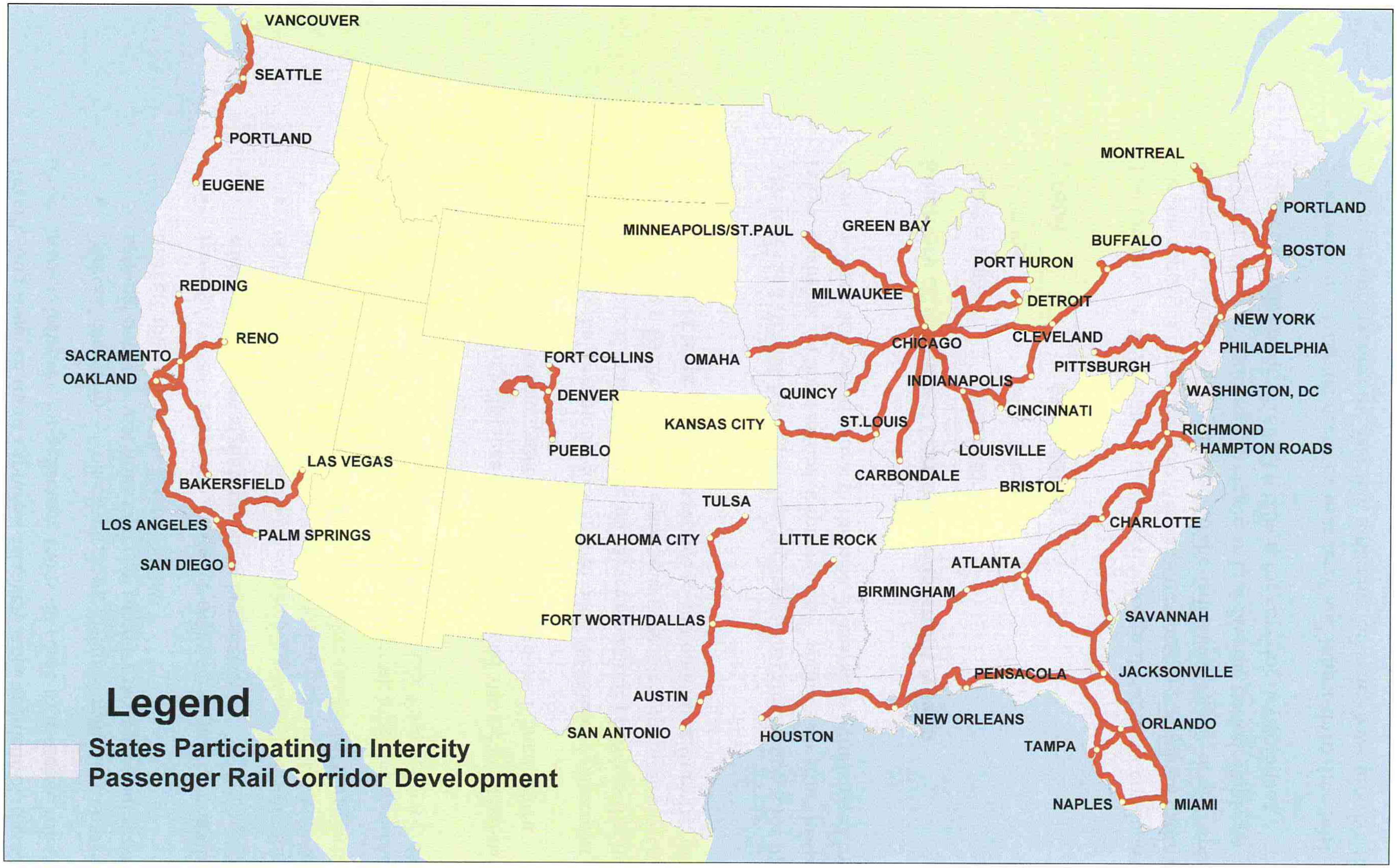



**Figure 2. Rail Corridor Development Is Nationwide in Scope**

Overall, long-distance trains capture a relatively small segment of the long-distance passenger market, however, long-distance trains do serve four unique roles:

- *National connectivity*—Collectively, long-distance trains form most of the national network that links different intercity passenger rail services and markets throughout the United States.
- *Essential services*—Many long-distance trains serve small communities with limited or no significant air or bus service.
- *Redundancy within the multimodal transportation system*—Long-distance trains provide an alternative form of travel during periods of severe weather conditions or emergencies that affect other modes of transportation.
- *Transporting mail and express*—Nearly all Amtrak long-distance routes carry a substantial amount of mail for the U.S. Postal Service, as well as other types of express freight.

For these reasons, long-distance train service should also be included in the national system on the future intercity passenger rail service in the United States.

In response to the growing interest in and need for intercity passenger rail, many states have been involved in the planning and development of corridors throughout the United States. As shown by the map on the previous page, these intercity passenger rail corridors are nationwide in scope, providing service to and benefiting from the participation of 36 states.

The states and Amtrak have identified the capital investment needs for most of these corridors, focusing on incremental improvements within two time horizons—near-term (next six years) and vision (through the next 20 years), as summarized by the table below.

### Summary of Projected Corridor Investment Needs

| | |
|---|---|
| Next 6 Years | $17.0 Billion |
| 7–20 Years | $42.9 Billion |
| **Total** | **$59.9 Billion** |

The estimate of $59.9 billion, developed through the analysis conducted with the states for this report, is comparable to Amtrak's own rough $50 billion estimate of the capital required to advance high-speed rail in the federally designated, high-speed rail corridors. In total, the state estimates, averaged over a 20-year period, imply an annual estimated capital expenditure of about $3.0 billion for corridor development.

The breakout of capital needs by near-term and longer-term time horizons is important because it underscores the fact that a number of states have projects that are "ready to go," with the planning, engineering, and environmental work completed. State projects

estimated to cost nearly $17 billion are queued up and could be undertaken quickly to rapidly expand corridor travel capacity.

Individual states and groups of states or corridors have made the public policy decision to invest state funds in intercity passenger rail capital projects in order to achieve a broad range of public purposes. Since the mid-1970s, soon after the creation of Amtrak, states have undertaken significant initiatives and made substantial investments in intercity passenger rail service. In addition to subsidizing passenger operations, states participated in capital programs with Amtrak before the 1990s without the assistance of federal funding using primarily state resources.

Amtrak forecasts state payments in FY 2002 of $133 million, an amount equivalent to nearly 10 percent of its passenger-related revenues. State investment in rail supports and strengthens other state transportation assets such as highways, transit systems, and airports. In the post-September 11 world, the intercity passenger rail system has provided a welcome redundancy for the other modes. Other returns on investment include local and regional economic development, environmental, and energy benefits.

Many intercity trains operate on interstate corridors and the benefits that accrue from state and corridor investment aggregate to the level of national significance, providing ample justification for a federal role in intercity passenger rail service. In addition to promoting research and development and enhancing safety, the federal government should join with the states in providing substantial long-term investment. Federal investment made in the major modes of passenger transportation—highway, transit, and air—is justifiably substantial. For FFY02, for example, the federal appropriation for investment in highways was approximately $32 billion, for transit $6.7 billion and for the Airport Improvement Program $3.3 billion. The appropriation for Amtrak was $521 million, about 1.2 percent of the total.

Since its creation, Amtrak's year-to-year funding struggles have resulted in inadequate investment and great uncertainty, severely hampering the effort to establish and maintain satisfactory intercity passenger train service. Given the continuing uncertainty concerning Amtrak's future, it is important to recognize that any significant changes in the corporate character of Amtrak should not be allowed to jeopardize the right to maintain or establish passenger service over rail freight lines and should allow states to acquire essential Amtrak assets.

Most importantly, what is needed is a strong federal-funding partnership. The user fee/trust fund financing mechanisms for the other modes of passenger transportation provides a secure, long-term, dedicated source of funding. A similar financing system is needed for intercity passenger rail. The private market cost of capital is prohibitive for both freight and passenger railroads. A dedicated national source of capital funding for passenger rail must not compromise existing transportation funding. Transportation logistics is a highly integrated, interdependent set of activities. All modes have current

and future financial investment needs that must be carefully considered. Existing program flexibility must be preserved. However, the only appropriate way to compare investment strategies is if each mode has its own dedicated source of funds.

A stable, predictable source of passenger rail financing would encourage long-term planning and investment strategies to achieve incremental benefits. Reduced travel times, increased frequencies, and modern amenities would build ridership and reduce operating costs. A stable source of funding would strengthen coordination with the freight community and state and local government and these partners would be able to structure their own investments with a greater degree of certainty.

Efficient and dependable intercity passenger rail service is necessary and achievable, but not without well-organized, systematic, and adequately financed effort involving the states and the federal government. The result will be an intermodal passenger transportation system that meets the mobility needs of the citizens of the United States much more effectively than is currently possible.

# I. Introduction

This report provides an overview of intercity passenger rail transportation in the United States. Intercity passenger rail transportation is best defined by its components:

- "Rail" refers to a mode of transport provided by trains operating on rails or similar fixed guideways.
- "Passenger" refers to the transportation of people instead of goods or commodities.
- "Intercity" travel comprises travel between states, counties, and major urban areas.

However, in spite of these specifications, intercity passenger rail also serves some local/commuter travel (although this is not typically its primary purpose), provides and/or operates over the same rails as freight service, and can be fully integrated with air, bus, and other modes of transport within the transportation system.

As shown on the map on the following page, intercity passenger rail transportation services are currently provided throughout most of the United States. The existing network includes of about 23,000 miles of rail over which 267 trains operate per day (excluding commuter trains) serving more than 500 communities in 47 states. Intercity passenger rail transportation serves about 23 million passengers annually, generating annual ticket revenue of about $1.1 billion.[4]

4 Total of Amtrak and Alaska Railroad annual data.


**Figure 3. Thirteen States Fund Amtrak Service**

Nearly all intercity passenger rail service is operated by the National Railroad Passenger Corporation (Amtrak).[5] Most of this service is part of the "basic system" that Amtrak operates nationwide. In addition, a number of states have contracted with Amtrak to operate additional state-supported intercity passenger rail services. The map on the previous page also identifies the 13 states that currently fund state-supported Amtrak services.

There are two distinct types of intercity passenger rail transportation services:

- "Corridor" services that focus on shorter-distance markets where intercity passenger rail can offer a "reasonable" travel time transportation option, and
- "Long-distance" services that focus on longer-distance markets where rail travel times can be very lengthy.

The map on the following page shows where these two types of services are currently provided nationwide. As summarized by the matrix on page 16, there are a number of important differences between the travel markets they serve and the services provided by corridor and long-distance trains.

In corridor markets, the primary focus is on providing frequent and reliable transportation service to customers. Corridor rail ridership and ticket revenue are highly correlated with these performance measures. As a result, intercity passenger corridor improvements have typically focused on improving the fixed infrastructure (rails, etc.) and on new train equipment providing improved speeds, frequency, and reliability.

In long-distance markets, the focus is more typically on providing a quality travel experience to customers who are spending many hours on the train. On-board amenities, including sleeping facilities, and food service, movies, and entertainment, are much more important to these long-distance customers. Amtrak's *Auto Train* is an example of service in this market. In addition to serving long-distance markets, most long-distance trains also provide a basic transportation service in many shorter-distance markets throughout the United States.

5 Intercity passenger rail service is also provided on the Alaska Railroad, owned by the state of Alaska.


**Figure 4. Long-Distance Trains Connect the Corridor Markets**

**Table 2. Characteristics of the National Passenger Rail Market**

| | Corridor | Long-Distance |
|---|---|---|
| **Market** | Under 500 miles<br>Several hours<br>Transportation<br>Frequent travel<br>Important business travel segment | 500+ miles*<br>Many hours/days<br>Transportation & travel experience<br>Less frequent travel<br>Mix of personal and leisure travel |
| **Service** | "Seat" service | "Seat" and "sleeper" service |
| | Travel time (speed)<br>Frequency (number of departures)<br>Reliability (on-time performance) | Departure/arrival time of day<br>On-board services<br>Reliability (on-time performance) |
| | High-speed rail (Acela)<br>Conventional speeds<br>Coach and business/first class<br>Snack/beverage service | Conventional speeds<br>Coach and sleeping car<br>(Viewliner, Superliner)<br>Lounge car/dining car |

* Long-distance trains also serve shorter-distance markets. In such cases, long-distance trains can be thought of as a string of back-to-back corridor services.

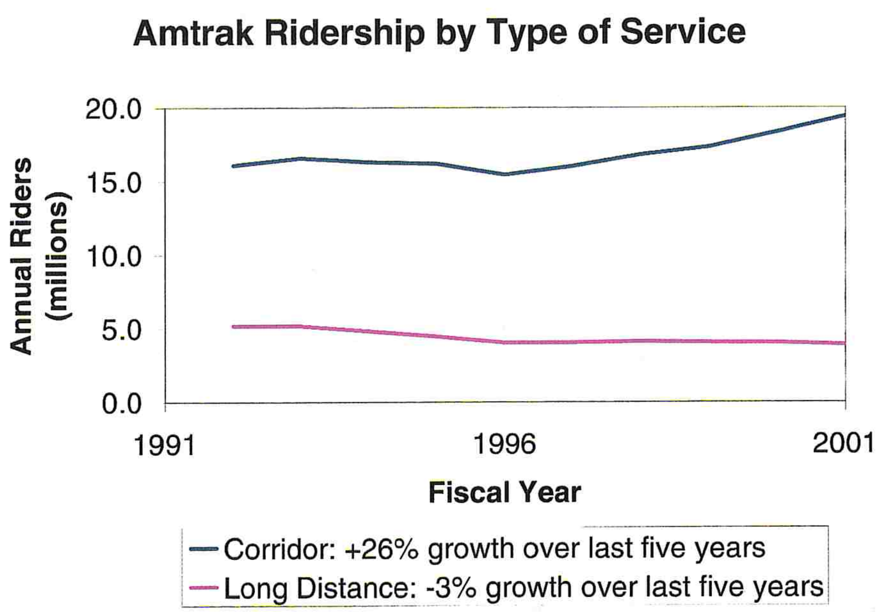



**Figure 5. Corridor Services Are an Expanding Segment of the Passenger Rail Market**

As the graphic above shows, only corridor services have shown recent ridership growth. This reflects both the market growth and investment in service improvements that have occurred in corridors. Most state capital funding and all current state operating funding of intercity passenger rail services is in corridors.

The next two sections provide a more detailed discussion of intercity passenger rail corridors and long-distance trains, addressing their markets, services, and key benefits. This is followed by an overview of intercity passenger rail investment needs and institutional issues.

# II. Corridor Markets

While acknowledging the role that long-distance intercity passenger rail can play in the United States transportation industry, the majority of planning and investment among states and the federal government focuses on the development of corridor passenger trains. There are many reasons for this focus, including:

- *The large share of intercity passenger travel that is concentrated in relatively short trips of less than 500 miles*—Over 80 percent of all trips exceeding 100 miles in length are less than 500 miles.
- *The relative efficiency of rail in serving highly congested markets that require long drives or short flights*—Corridors with average speeds that are faster than driving can provide an effective alternative to both automobile and air service in markets between 100 and 500 miles. Congested highways can make automobile travel both unpredictable and arduous. Relatively short air flights may not be time-competitive due to the significant time requirements for transportation to and from the airports, as well as for check-in. In addition, many airports are capacity-limited, and could be more effectively utilized if some short flights could be replaced with high-speed corridor development.
- *Many success stories upon which to base future development and planning*—Both the public and private sector are most interested in investing in intercity passenger rail when and where there is a proven history of the market responding to past investments. The remainder of this section will highlight a few of the success stories.

## Corridor Success Stories

### California Corridor Development

California has had the largest state-led, corridor-development program in the United States, as summarized in the corridor profiles found at the end of this report. Over $1.6 billion of state money has been invested in three corridors and related facilities and equipment throughout the state, coupled with over $900 million of Amtrak, federal, freight railroad, and local money.

The Capitol Corridor between the Sacramento area and the Bay Area has been the fastest growing intercity passenger route in the United States between FY 1996 and FY 2001. Ridership has grown more than 135 percent, from 457,000 to 1.07 million riders. Frequencies on the most traveled section of the route, between Sacramento and Oakland, have grown from the original three to nine round trips per weekday.

Other corridors in California (*San Joaquin* and *Pacific Surfliner*) have grown almost as dramatically, as illustrated in their corridor profiles. In all situations, a partnership of state and other funding sources has provided upgraded or new station facilities, tremendous

improvements to the rail infrastructure, new equipment that is well-designed for corridor rail service, and improvements to maintenance facilities.

### Pacific Northwest Corridor Development

Washington and Oregon have led an extensive corridor-development program in the Pacific Northwest since 1993, as summarized in the corridor profiles. Over $125 million of state money has been invested in the Amtrak *Cascades* service that links Vancouver, Seattle, Portland, and Eugene. This money has been coupled with over $355 million of Amtrak, federal, freight railroad, and local money.

Amtrak *Cascades* service has grown rapidly between FY 1996 and FY 2001. Ridership has grown more than 85 percent, from 304,000 to 565,000 riders. Frequencies on the most traveled section of the route, between Seattle and Portland, have grown from the original one to three round trips per day.

A partnership of Amtrak and Washington state has purchased new equipment that is designed for corridor rail service. In this case, equipment capable of tilting on curves has allowed for faster trips with minimal infrastructure investments. The equipment also utilizes state of the art modular components and vendor-provided equipment maintenance, leading to a 99.9 percent availability rate. This is in spite of the fact that no "protect" equipment is available to cover services when equipment is undergoing maintenance.

### Northeast Corridor Development

Federal and state investment has been instrumental in the development of the Northeast Corridor since it was transferred from the Penn Central Railroad to Amtrak and various commuter agencies in the 1970s. More than $4 billion has been invested from federal sources since the original Northeast Corridor Improvement Program began in 1976. In the recent past, much of this investment has been in the segment between New Haven and Boston, and was aimed at preparing the route for electrified 150 mph high-speed rail.

The investment in the Northeast Corridor has included electrification, track realignment and station improvements (see corridor profile for additional details). As equipment deliveries have continued, and conventional service has been accelerated from 110 to 125 mph, both ridership and revenue have improved significantly. This has been especially marked in the period since the September 11 terrorist attacks, during which *Acela Express/Metroliner* ridership increased by more than 40 percent over the previous year.[6]

6 October and November 2001 ridership compared to October and November 2000 ridership.

### *New York State Corridor Development*

New York state and Amtrak have been partners in developing the *Empire* Corridor between New York City, Albany, and Buffalo. Investments in the past have included upgrading track between New York and Albany to allow for 110-mph speeds, as well as development of the West Side Connection that allowed corridor trains to reach Penn Station instead of Grand Central Station in New York City. Access to Penn Station allowed connections to be made to the rest of the Amtrak system, an important feature of the corridor's development. A plan for the corridor's additional development is also in place (see corridor profile).

*Empire* service has grown significantly between FY 1996 and FY 2001. Ridership has grown more than 33 percent, from 978,000 to 1.30 million riders.[7] Frequencies on the most traveled section of the route, between New York City and Albany, have grown from eight weekday round trips in FY96 to 13 weekday round trips in FY01.

### *Washington, DC, to Richmond, VA, Corridor Development*

State and private investment have combined to improve the Washington to Richmond corridor, served by *Acela Regional* and long-distance Amtrak trains, as well as Virginia Railway Express (VRE) commuter service. Virginia, CSX, and VRE have combined resources to improve the AF interlocking near Alexandria, which has allowed for greater speeds and reliability through this critical area. In addition, significant capacity improvements have been made through track, signal, and bridge work on other sections of the corridor. A plan for the corridor's additional development is in place (see corridor profile).

Intercity travel within corridors is growing and significant. It is also increasingly multimodal—different geographic markets and travelers are served by a range of air, auto, rail, and other modes of travel. Intermodal connections are also important, providing key linkages between corridor markets and the rest of the world.

## Market Characteristics

As discussed earlier, corridor markets typically include travel between points less than 500 miles apart. As shown by the figure on the top of the following page, such trips dominate intercity passenger travel within the United States—about 81 percent of all intercity passenger trips (greater than 100 miles) are less than 500 miles.

7 Includes ridership that continues west of Buffalo to Niagra Falls and Toronto. The *Lake Shore Limited,* the one long-distance train that continues beyond Buffalo to Chicago, is not included.

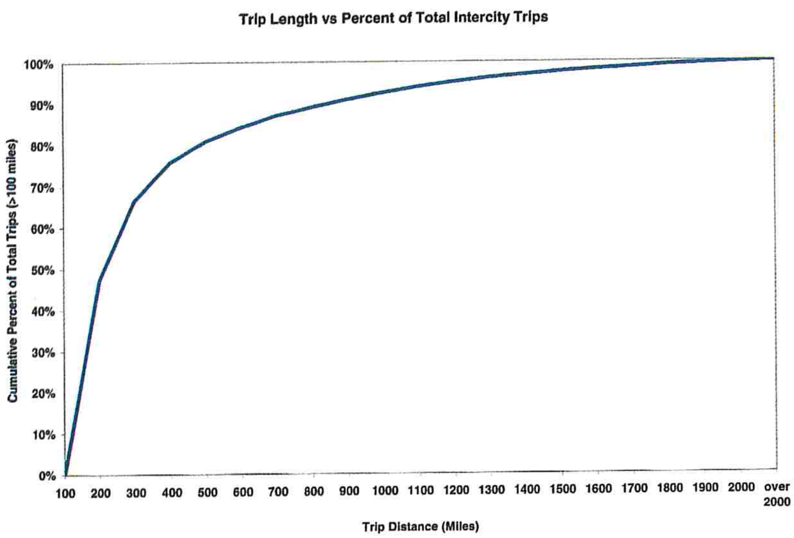
Corridor trips have many of the following characteristics:

- Typically short distances/travel times
- Often frequent/regular travel
- Significant business travel market
- Many single-day round trips

These characteristics emphasize the need for transportation system performance with respect to travel time, cost, and reliability.

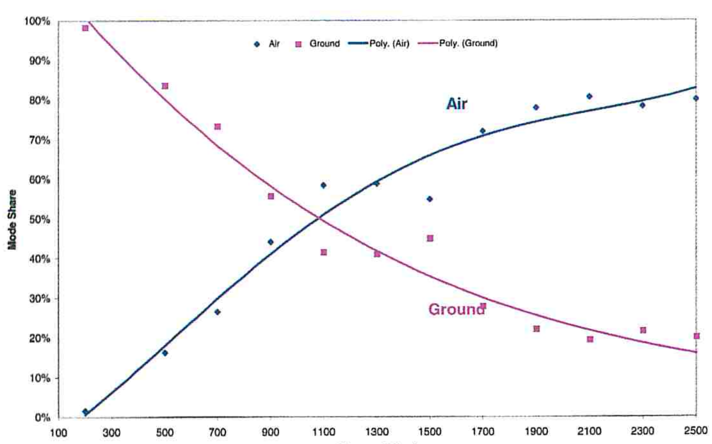
## Corridor Modes of Travel

Most intercity corridor trips use auto and other modes of ground transportation (e.g., rail, bus, etc.) for travel within the corridor. As shown by the figure below, air is only an important mode of travel in the longer end-point corridor markets and for long trips entering or leaving a corridor. For short trips, the speed advantages of air are nullified by the significant fixed travel time associated with access to and from airports; ticketing, baggage, security, and waiting at the gate; and boarding and alighting, taxiing, and take-off/ascent or descent/landing.




Source: 1995 American Travel Survey.

**Figure 6. Most Intercity Travel Is for Short Distances**




Source: 1995 American Travel Survey.

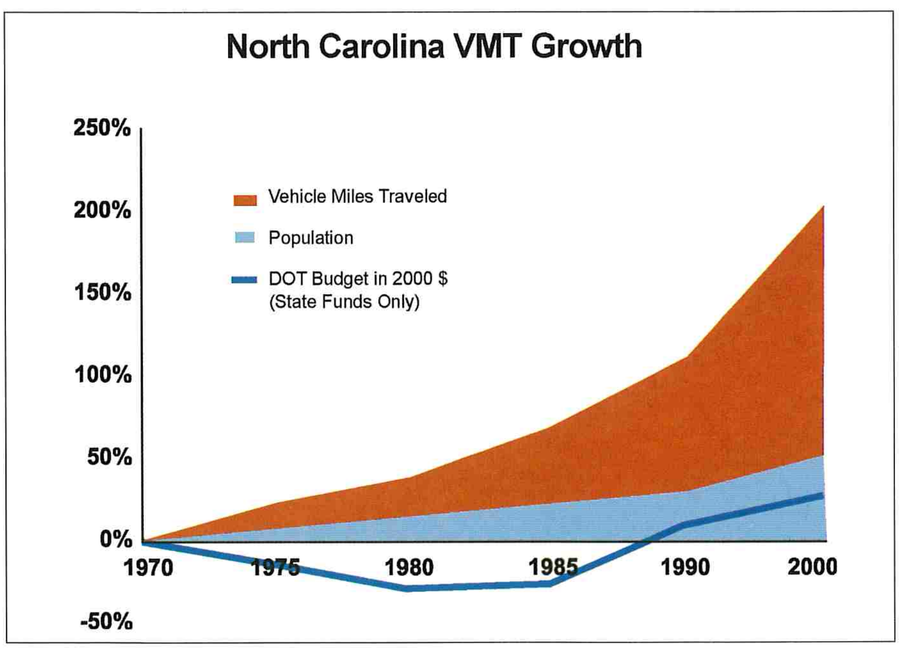
**Figure 7. Ground Travel Dominates the Short-Distance Travel Market**

## Auto Travel

Auto travel is, and is likely to remain, the most frequently used mode of travel in corridors. This is particularly the case with respect to important intermediate markets within corridors. However, auto travel is subject to highway congestion—which adds time and uncertainty to travel by this mode. With limited opportunities for significant expansion of highway capacity in many congested corridors, it is unlikely that these conditions will improve in the future.

According to the Texas Transportation Institute, Americans are spending more time stuck in traffic than ever before and the delays are getting significantly worse. Drivers in Los Angeles spend an average of 56 hours a year in traffic jams, more than a typical work-week, costing approximately $1,000 per person in lost productivity. Atlantans are stuck behind the wheel 53 hours a year, double the time of seven years ago. Nationally, the average motorist is stuck in traffic 36 hours a year, up from 11 hours a year in 1982. Taken together, Americans are losing $78 billion a year in work productivity and excess gasoline use while in traffic tie-ups.

A growing population and rising incomes have fostered much of the highway congestion, as has the lack of transportation alternatives. But even in fast-growing states, highway traffic is increasing at a greater rate than the growth in population. As the following chart shows, VMT (vehicle miles traveled) has greatly outstripped population growth in North Carolina, similar to the experiences of other states. Not only is there an ever-increasing population, but also more people are driving, more often and farther. Such trends only compound the existing highway congestion.




Source: NCDOT.

**Figure 8. Growth in Vehicle Miles Traveled Easily Outpaces Population Growth**

In the states along the southern Atlantic coast, where planning is well advanced to create the Southeast High Speed Rail (SEHSR) network, traffic on interstates parallel to SEHSR routes is congested over much of the distance. Between Washington, DC, Richmond and Petersburg, VA, I-95 traffic levels exceed that highway's design capacity not just during peak hours, but also throughout the day. So onerous and notorious has this stretch of highway become that it discourages discretionary travel far beyond its congested segments. On I-85, which links important regional centers in the Piedmont from Durham and Charlotte to Greenville/Spartanburg and Atlanta, daily traffic levels regularly exceed the interstate's carrying capacity, causing delays and unreliable travel times. Traffic on this segment of I-85 increased 68 percent between 1986 and 1996.

The Midwest is experiencing interstate highway congestion similar to that of the Southeast. Indiana's four interstate highways (I-65, I-80, I-90, and I-94) that traverse the northwest counties of Lake and Porter leading to Chicago are at, or above, their design capacity the length of those counties. Every interstate highway leading out of Indianapolis and Milwaukee has traffic congestion that is officially labeled as ranging from severe to extreme. Yet, it is important to note that this highway congestion is not found just in urban centers and metropolitan areas. It now occurs in rural regions that connect urban areas.

I-70 from the Ohio border near Richmond, IN, across Indiana to the Illinois border west of Terre Haute is at or above its design carrying capacity for nearly two-thirds of the distance. I-65, which parallels the route of Amtrak's *Kentucky Cardinal*, between Indianapolis and Louisville, KY, is at or above its planned carrying capacity for nearly all of those 114 rural miles. I-90/I-39 between Madison, WI, and Beloit, IL, is rated as having severe-to-extreme congestion, and on a Sunday evening in the summer as people come back from their lake cottages, it is a 54-mile parking lot.

Along the shores of Puget Sound and through the fir forests of the Pacific Northwest corridor from Vancouver, BC, through Seattle/Tacoma to Portland, OR, the parallel highway, I-5, is operating above its carrying capacity from Everett, WA, in the north to the Cowlitz County line in the south, a distance of 159 miles. Even smaller metro areas such as Vancouver, WA, face congestion problems.


Source: SEHSR: *A Time to Act,* June 1999.

**Figure 9. Alternative Travel Modes Are Already Beyond Capacity in the Southeast**

In California, the interstates that parallel the Auburn/Sacramento–San Jose Capitol Corridor (I-80, I-680) are congested the entire length of the corridor west of Roseville. This constant traffic has been credited with adding significant numbers of riders to the *Capitols.* In Southern California, US 101 and I-5 are considered at or above their design capacity from Santa Barbara through Los Angeles and Orange Counties to San Diego, a distance of 235 miles. People's reluctance to drive through Los Angeles and Orange Counties has helped make the San Luis Obispo–Santa Barbara–Los Angeles–San Diego *Pacific Surfliner* corridor the most heavily traveled Amtrak route outside the Northeast.

Yet, as interstate highways across the nation slowly come to a halt under the weight of traffic volumes they were never designed to carry, building more miles of interstates is now generally believed not to be the answer. Interstate highways have become increasingly expensive to build, especially in urban areas, the environmental permitting process is onerous and clean air standards in many locations will not permit expansion of the highway capacity. Beyond these hurdles, in many congested corridors, there is just physically no room to add general purpose auto lane capacity. States and communities are

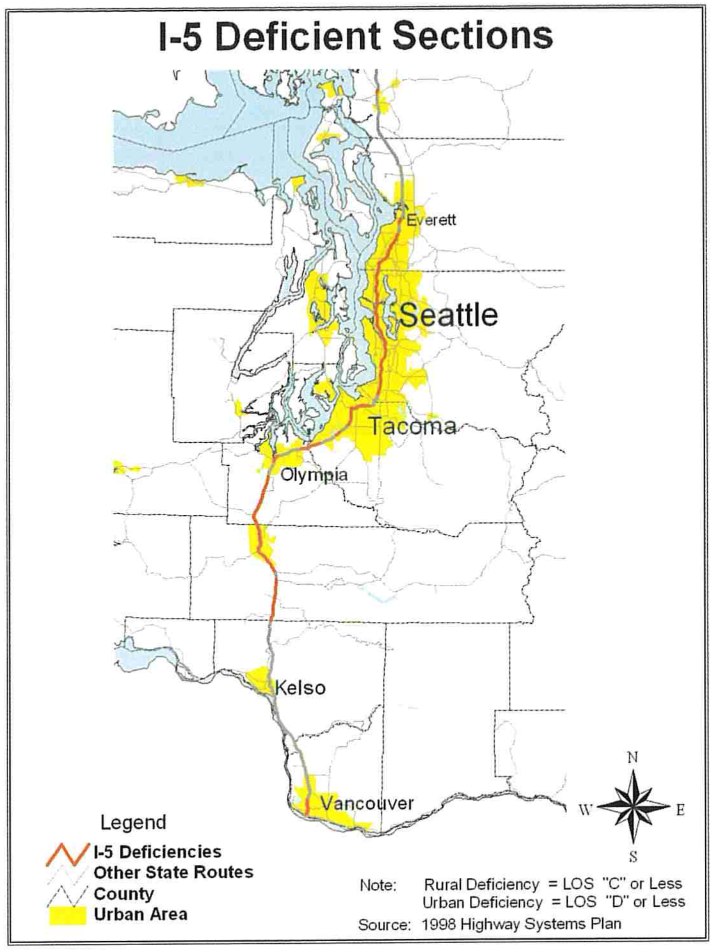



**Figure 10. Congestion Along I-5**

increasingly looking toward public transportation solutions, ranging from light rail in urban centers to intercity high-speed rail corridors, to provide the traveling public an accessible and affordable option to automobile use for such trips.

## Air Travel

Within corridors, air travel is oriented primarily to the longer distance end-point markets. However, even the number of air passengers in these markets is small in comparison to air travel in markets over 500 miles, many of which are served through a network of airline hubs throughout the United States. The air transportation system has undergone significant change over the past year in response to the events of September 11 and, many would argue, is still changing in response to recent events.

Air travel is expected to gradually grow toward 2001 levels, but many effects of the September 11 events will remain. Increased security requirements and the need to arrive earlier at airports have become the norm, continuing to discourage short trips by air. More routes will by flown by regional jets, and in smaller markets turboprops, reducing the number of seats if not departures offered by the airlines. Airport modernization and

construction projects have been put on hold as the necessary capital funds have not been generated in some cases, and in other cases the stress and crowding on airport gates, runways, and other facilities has disappeared. As capacity and competition is reduced the airlines will be tempted to try to recoup some of their losses of 2001 by raising fares.

The benefits to passenger rail corridors caused by the public's reluctance to fly following the events of September 11, the paring back of service between cities and especially to smaller communities, are undoubtedly temporary in nature. Over time, people will resume their travel habits. What may not change, however, is a conviction that the nation should not be so vulnerable to the disruption of any one mode of travel, that there should be some redundancy in the transportation system, some available options for the traveling public. People and policymakers in the months since September 11 have increasingly come to understand the importance for the individual and the nation as a whole in having travel alternatives available.

In 1993, 23 commercial airports in the United States, including Boston Logan, Washington Reagan National, Atlanta Hartsfield, Chicago O'Hare, St. Louis Lambert, Seattle-Tacoma, and Los Angeles International experienced at least 20,000 annual hours of air carrier delays. In 2003, 10 years later, 32 commercial airports are expected to have at least 20,000 annual hours of air carrier delays. This represents a one-third increase.

### Table 3. Airports with Projected 2003 Aircraft Delays Over 20,000 Hours

| | | | |
|---|---|---|---|
| Atlanta Hartsfield | ATL | New York La Guardia | LGA |
| Nashville | BNA | Orlando | MCO |
| Boston | BOS | Memphis | MEM |
| Baltimore Washington | BWI | Miami | MIA |
| Charlotte/Douglas | CLT | Minneapolis-St. Paul | MSP |
| Cincinnati | CVG | Ontario | ONT |
| Washington National | DCA | Chicago O'Hare | ORD |
| Dallas-Ft. Worth | DFW | Philadelphia | PHL |
| Detroit | DTW | Phoenix | PHX |
| Newark | EWR | Pittsburgh | PIT |
| Honolulu | HNL | Raleigh-Durham | RDU |
| Washington Dulles | IAD | San Diego | SAN |
| Houston Intercontinental | IAH | Seattle–Tacoma | SEA |
| New York John F. Kennedy | JFK | San Francisco | SFO |
| Las Vegas | LAS | Salt Lake City | SLC |
| Los Angeles | LAX | St. Louis | STL |

Source: FAA, 1994 ACE Plan, Chapter 1–17.

The events of September 11, 2001, caused a significant, if temporary, reduction in air travel delays across the country as the airlines cut, on average, 15 to 20 percent of their flight schedules in the months following the terrorist attacks. With fewer flights and less competition for gate space and runway access, on-time performance increased significantly. These flight cuts are now being gradually restored as people return to the airways and in some cases make up for previously delayed or canceled trips. Therefore, the projected hours of delay for 2003 are still believed to be reasonably predictive.

## Intercity Passenger Rail

As discussed earlier, intercity passenger rail travel in corridors has experienced strong growth over the past five years. As will be described in further detail later in this report, this growth reflects a combination of market growth and increased service and investment in selected intercity passenger rail corridors throughout the United States.

Intercity passenger rail offers several advantages in serving corridor markets, including:

- Direct service to and from densely developed central cities, which may otherwise involve:
  - Travel on congested highways and parking challenges, or
  - Long, unreliable access trips to and from airports located in suburban areas.
- Providing service to and from communities not served by air.
- Use of existing rail rights-of-way, many of which are currently underutilized (unlike most highways and corridor airports).
- Scalable capacity that can more quickly respond to growth and better match seasonal and day-of-week fluctuations in demand when equipment is available to provide additional service.

Examples of these qualities of intercity passenger rail service can be found in many of the existing and proposed rail corridor services, as discussed in a series of detailed corridor profiles provided later in this report. Two key intermodal opportunities are highlighted below.

## Rail–Air

As a result of the increasingly service-oriented nature of the American economy, business travel is very sensitive to time, price, and reliability. This marketplace discipline has prompted intercity passenger rail and commercial aviation to begin to re-evaluate their business relationships, especially in the shorter-distance markets. Among the public benefits of enhanced private sector efficiency is a reduction in social costs such as a reduction in congestion and enhanced safety. These are not entirely free social goods; a degree of transportation system redundancy is lost in the process.

But the more significant recent trend has been a shift toward greater intermodal cooperation. For example, in the Northeast Corridor when bad weather impacts its Newark, NJ hub, Continental Airlines transfers passengers from short-distance flights to Amtrak. Amtrak guarantees seats for air travelers displaced by canceled flights when Continental Airlines notifies Amtrak. Amtrak recently expanded this relationship to other cities and is evaluating how to improve technological links to enhance customer services in these situations.

The construction of a $145 million New Jersey Transit station at Newark International Airport reflects the growing coordination between the modes. In December 2001, the Port Authority of New York and New Jersey opened AirTrain Newark. This rail line links Newark Airport to Amtrak and regional commuter and public transit lines through connections at the Penn Stations in Newark and New York City. The AirTrain line, which is expected to handle three million riders within a year, goes directly into Newark Airport. The passenger transfers to the airport monorail system to get to terminal concourses and the parking lots. Continental Airlines, which recently opened a $1.4 billion concourse at the airport, actively participated in the design of the station.

Amtrak also has a modest intermodal project at the Burbank Airport in California and provides connecting bus service between the San Francisco International Airport and the *Capitol* Corridor.

Planning is underway for new rail service to General Mitchell International Airport in Milwaukee, using the "*Hiawatha* Service" to serve Chicago and its northern suburbs from the airport. Amtrak and *Midwest Express* would enter into a code-sharing agreement. Preliminary forecasts estimate 30,000 to 50,000 "codeshare" passengers plus 50,000 to 65,000 annual "rail-only" passengers on or off at Mitchell.

On November 8, 1999, Amtrak and the Pennsylvania Department of Transportation announced a $140 million plan for higher-speed rail in the *Keystone* Corridor. Construction of a new intermodal terminal station at Harrisburg International Airport is part of the plan.

T.F. Green Airport in Warwick, Rhode Island, is proposing to build a $168 million Amtrak Station and 4,000-car parking garage. The new station would link the airport with the Northeast Corridor.

The Rhode Island Department of Transportation is working closely with the Massachusetts Bay Transportation Authority (MBTA) to provide shuttle service between T.F. Green Airport and Providence. A train every 20 minutes between the airport and Providence is under review. Consideration is also being given to early morning and late evening MBTA service between Boston and Warwick for travelers from Greater Boston, who use T.F. Green airport.

Rail transit currently connects three major airports in the Northeast Corridor with intercity passenger rail stations as shown below.

### Table 4. Intermodal Connections in the Northeast Corridor

| Location | Transit Service | Airport Connection | Intermodal Rail Station |
|---|---|---|---|
| Boston | MBTA | Logan | North and South Stations |
| Philadelphia | SEPTA | Philadelphia Int'l Airport | 30th Street Station |
| Washington | Metro | Reagan National | Union Station |

Amtrak launched the first United States air/rail code share partnership at the Baltimore–Washington International Airport (BWI) with Icelandair in June 2001. The effort was launched both to foster Amtrak's relationship with BWI and to develop operational experience in airline code sharing. BWI was Amtrak's 17th busiest station in FY 2001 with 530,044 passengers. Longer-term expansion plans include a direct link to the Northeast Corridor.

In fall 2001, Continental eliminated its short-connector flights from Philadelphia to Newark. Travelers can choose among 17 trains connecting Philadelphia and Newark each weekday.

Under a January 2002 agreement, members of Continental's frequent-flier program, OnePass, can earn miles when traveling on Amtrak's *Metroliner* and *Acela Express* trains between New York and either Washington or Boston. Members of the OnePass program and Amtrak's Guest Rewards program will be also able to exchange points and miles.

Beginning in mid-March 2002, travelers between Newark International Airport and four cities (Philadelphia; Wilmington, DE; and Stamford and New Haven, CT) can book train travel to and from the airport as part of their flight reservation. Continental will assign its airline designator code to trips on Amtrak's *Acela Regional* and *Keytstone* trains. In addition to the code-share relationships Amtrak has established, it also participates in selling air-rail packages. United Airlines and Amtrak partner to provide one-way rail transportation coupled with a return journey by air. On the West Coast, Amtrak also partners with Alaska Airlines. Alaska Airlines' frequent flyer benefits can earn and redeem miles on Amtrak services, providing Amtrak with valuable additional revenue and Alaska Airlines with a valuable award to offer its members. The Alaska Airlines partnership includes all West Coast corridor trains, plus the *Coast Starlight*.

## Bus–Rail

The purpose of dedicated feeder buses is to extend the reach of passenger rail service into communities that could not be economically served by a stand-alone train. For example in October 1984, Amtrak initiated a dedicated bus between Richmond and

Charlottesville, VA, to connect with the Washington, DC–Chicago *Cardinal* in both directions. The bus connection effectively provided Richmond residents with direct east–west rail service to Chicago, without the cost of running a train to Charlottesville, or the need to journey north first to Washington, DC. Not only was the bus connection instantly popular, measurably improving the passenger loads on the *Cardinal,* but Amtrak found that it took on average only seven passengers per bus to break even. That bus connection still runs.

The most widespread use of feeder bus services to date, however, has been on Amtrak corridors in California. In fact, so extensive is the California feeder bus network that Amtrak contracts for more bus schedules in California than it runs trains in the Northeast Corridor, Empire Service, and the Philadelphia–Harrisburg *Keystone* Corridor combined.

In many ways, the bus connections to and from Amtrak corridor trains in California have transformed the utility and viability of those rail services. In 1978, Amtrak operated one *San Joaquin* round trip between Oakland and Bakersfield, CA, daily and it was slated for discontinuance under the Congressionally mandated route restructuring of 1979.

That early *San Joaquin* was a truly marginal performer averaging 53 passengers on board per train mile,[8] and farebox revenues that covered approximately 21 percent of the train's operating costs. The problem was, as one Amtrak official explained, the *San Joaquin* took passengers down the Valley and terminated where they did not want to go, namely Bakersfield. Potential passengers wanted to go beyond Bakersfield to Los Angeles, San Diego, and Las Vegas.

California intervened in early 1979 and agreed, in exchange for substantial labor concessions, to provide financial operating support for the *San Joaquin* and to double the number of daily frequencies. But what turned around the fortunes of the *San Joaquin* was the state's creation of a network of dedicated feeder buses that connect to the train at major stations to transport passengers to their ultimate destinations. In 2002, a fleet of connecting buses carry *San Joaquin* rail passengers from various enroute points to their destinations over 11 different bus routes. From Martinez, buses travel north to Napa, Santa Rosa, and Eureka/Arcata. From Stockton, the buses go north to Sacramento, Marysville, Chico, and Redding, as well as west to Livermore and San Jose. In Bakersfield, connecting buses fan out to Las Vegas; Pasadena, San Bernardino, Palm Springs, and Indio; Oxnard and Santa Barbara; Los Angeles, Long Beach, and Laguna Beach; and Santa Ana, Oceanside, and San Diego. Fully 67 percent of all *San Joaquin* passengers begin or end their journey on an Amtrak connecting bus.

The increasing number of *San Joaquin* passengers has allowed California to expand the number of daily trains. In late 1989, a third *San Joaquin* frequency was added, with a fourth

8 A train mile is passenger train traveling one mile. Passengers per train mile are a measure of the average number of passengers on each train frequency over its route.

frequency initiated in late 1992. In February 1999, a fifth *San Joaquin* was added north of Stockton that for the first time continued on to Sacramento. In March 2002, a sixth train was started, running from Sacramento to Bakersfield. As service has expanded, both ridership and the farebox recovery ratio have improved dramatically.

The San Jose–Sacramento/Auburn Capitol Corridor and the *Pacific Surfliner* corridor to San Diego have also benefited from dedicated connecting buses, although not to the dramatic extent as the *San Joaquins*. Approximately 29 percent of riders on the *Capitols,* for example, begin or end their Amtrak trips on dedicated buses departing San Jose to such places as Santa Cruz, Monterey, and Salinas and from Sacramento to Nevada City and Reno.

Feeder buses have allowed *Pacific Surfliner* trains to originate farther and farther north of Los Angeles as the dedicated Amtrak buses have built the passenger base. In 1986, buses to and from Santa Barbara began to connect to two Los Angeles–San Diego trains. By fall 1990, traffic had built to the extent that two trains were extended northward to Santa Barbara, and two dedicated buses were initiated north of Santa Barbara to San Luis Obispo in April 1991. In October 1995, one of the four Santa Barbara *Pacific Surfliner* frequencies was extended north to San Luis Obispo, replacing a bus.

It is fair to say that most passengers, who use connecting bus services to begin or end their Amtrak journeys, would not use the train if they could not access the train by the network of Amtrak buses in California. In FY 2001, this represented 683,000 rail passengers, generating net train and bus revenues (i.e., after deducting the cost of the bus operations) of $10.7 million on California corridor services.

The significant success of the Amtrak connecting bus services has caught the attention of other rail planners. The Midwest Regional Rail Initiative (MWRRI) has made connecting bus services an integral part of its Midwest corridor planning. MWRRI projects that, similar to the California experience, extending the reach of rail service beyond the train's destination to other communities through dedicated bus connections will greatly improve the usefulness and financial viability of the MWRRI rail services. By providing feeder buses to communities up to 200 miles beyond the trains' destinations on MWRRI corridors—most feeder bus connections are less than 200 miles—MWRRI projects that 80 percent of the Midwest's population will be within an accessible distance of passenger rail service.[9]

A Chicago–Omaha train, as an example, could have connecting bus service to such regional sources of passengers and revenues as Cedar Rapids and Cedar Falls (from Iowa City), Ames and Ft. Dodge (from Des Moines), and Sioux City and Lincoln, NE (from Omaha). MWRRI routes from Chicago to Green Bay, WI, and Chicago to Port Huron,

9 Midwest Regional Rail Initiative, Strategic Assessment and Business Plan, Final Report, August 1998.

MI, could easily tap into the summer recreation markets in northern Wisconsin and Michigan through bus connections to Wausau and Door County in Wisconsin and to Traverse City, Petoskey, and Sault Ste. Marie in Michigan.

Amtrak and California over the past 20 years have proven beyond question that rail passengers will take the bus to and from their rail journey if the bus connection is viewed as a seamless and integral part of the rail travel experience, with through-ticketing and dedicated buses. Not only have such bus connections been of great value to passengers, they have also consistently contributed mightily to the bottom line of the trains to which they connect.

## Economic Benefits of Intercity Passenger Rail Corridor Investment

Transportation systems are an important ingredient in the economic success of cities and regions. Dependable, efficient and safe movement of people is essential for an economy to operate. Most parts of the United States economy have already built up a significant stock of transportation capital through decades of investment. As a result, the economic goal of additional investment has broadened from strictly development objectives to include concerns regarding regional competitiveness and connecting local producers with larger national markets.

Intercity passenger rail has the potential to accommodate growth and enhance regional economic competitiveness. By itself, investment in intercity rail will not cause growth. Moreover, as with any type of investment, public or private, success is not guaranteed-numerous other factors come into play and influence the outcome. That said, careful and selective rail investment has the potential to support the economic goals of cities and regions when the investment is complemented by public and private initiatives, when there are synergies between various transport modes, or when modernized infrastructure or services are introduced into the economy.

The goals of this section are twofold. First, it will delineate the potential benefits that can be attained through investment in intercity passenger rail. Second, where examples are available, it will describe the conditions that enabled these economic benefits to be attained in practice.

### *Direct Employment Benefits Due to Service Expansion*

Rail investment affects regional economies most directly through the introduction of a higher quality or expanded activity into the economy. New stations or expansions of existing service require employees to be hired, increasing the amount of income earned and spent in the local economy. Any construction required to enable the new service bolsters this income and employment effect further for the duration of the building activity. The additional income earned by these new rail and construction employees, as well as

the rail line's purchases of other goods and services from the regional economy, increases the amount of local spending and generates additional job creation as businesses hire to meet this newly created local demand.

### *Visitor Expenditures and Tourism*

By improving the frequency or speed of service, investment in passenger rail increases access to the locations served. The potential benefits are threefold, depending on the type of investment made: travel time savings, travel cost savings, and the benefits afforded by a downtown terminal, as compared with an airport or roadway network. The travel timesavings due to service upgrades can be significant. Introduction of *Acela* service on the Northeast Corridor has reduced travel time from New York to Boston by one hour and 25 minutes. Elsewhere in the United States, the travel timesavings can be even greater. For example, the Midwest Regional Rail Initiative expects to cut the current train travel time from 5 hours, 46 minutes to 3 hours and 41 minutes on the Chicago–Detroit route. All of the major corridors that comprise the MWRRI System are projected to save at least one hour of travel time, four corridors save three hours or more, and the remaining corridors save four hours or more.

By reducing a traveler's cost of making a trip, the rail investment increases accessibility and induces people to either switch from another mode to rail or to make a trip when they otherwise would have stayed home. This latter induced travel increases tourism to the corridor markets, generating purchases of tourism-related goods and services, and increases demand for labor and materials. For example, the Alaska Railroad has developed a uniquely successful business arrangement with the tourist shipping lines. The cruise ship lines purchased their own double-decker dome passenger cars and the Alaska Railroad hauls these cars to landlocked destinations around the state.

Research has shown that shopping is the single most popular activity among domestic United States travelers and their retail purchases are significant. Spending among tourists counters the stereotype of the postcard and souvenir-laden traveler, according to recent research conducted by the Travel Industry Association.[10] In a recent survey of travelers, who shopped during their trip, one in five spent more than $500 on a trip during 2000. Shopping travelers most often spend money on clothes or shoes for themselves. Entertainment venues such as sporting and cultural activities benefit as well.

While improved access lays the groundwork for increased tourism within the corridor, marketing programs that raise awareness of the service increase the likelihood of getting a good return on the rail investment. The Illinois Rail Passenger Program has a particular focus on marketing and customer service that has enhanced ridership. In 1997, the state initiated a new partnership with Amtrak, creating a three-year, fixed-price contract that included specific performance penalties for excessive train delays. In addition, the

[10] "The Shopping Traveler," Travel Industry Association of America, April 2001.

state actively markets rail despite a small budget. In FY 2002, the state launched a Downstate Illinois Amtrak Vacations Program featuring trains/travel/hotel packages and a program to improve rental car access at stations with a discount for Amtrak travelers. The state also augments Amtrak's marketing within the state.

The results of these efforts are measurable. In 2000, over 970,000 people traveled by train to destinations in Illinois, the highest level since the program's inception. Not only is train ridership rising throughout the state, public awareness of rail as a viable alternative is also rising. This awareness is fueling efforts to improve service further and is an impetus behind the planning for the Midwest Regional Rail Initiative to bring high-speed rail to the region.

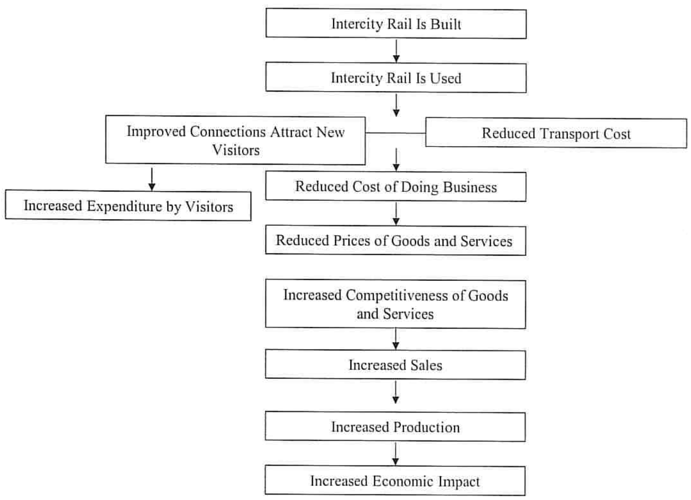



**Figure 11. The Benefits of Rail Investment Flow Through the Economy**

## *Station/Terminal Development Impacts*

A potential byproduct of rail investment is the impact on land development around the station. By increasing the number of people traveling through the corridor, and by potentially drawing from a greater distance due to service improvements, the market potential of locations around the train stations is expanded. This impact can increase the rents generated on existing locations. Moreover, rising rents can spark additional retail and office development as builders react to the rising rental prices.

In recent years, rail stations themselves have become the focus of development activity. Arguably the most successful initiative to date has been Union Station in Washington, DC. The station attracts 23.5 million visitors a year and ranks as the most visited site in Washington, DC. The station is truly a transportation nexus; Amtrak, Maryland Area Railway Commuter (MARC) service, Washington Metro links to Reagan National Airport and rest of DC, buses and taxis to all local destinations, and rental cars are all in one place. Union Station is the second most used metro stop in the WMATA system.

But beyond the station's transportation role, Union Station has been developed into a focal point of economic development and reuse. The station has become a destination in its own right. Much of the station's success results from investments and operating policies that allow the station to serve the surrounding local neighborhood. Some of the most important factors that have led to success in the Washington Union Station redevelopment effort are noted below.[11]

1. The building itself is an historic Beaux-Arts structure built in 1908 that was allowed to deteriorate over time and fall into disuse. Three years of renovation and an investment of $160 million between 1985 and 1988 brought forth the re-emergence of the building as a grand public space with architectural details that modern commercial building budgets could never replicate. Animated by travelers' comings and goings, it is a lively place where people enjoy spending time.

2 A public–private partnership between the U.S. Department of Transportation, which owns the property, and real estate firm Jones Lang LaSalle (JLL), which has a 99-year lease and who serves as the leaseholder for the station's retail tenants, allows the station property to be managed as a business. JLL manages the day-to-day operations of the station, including serving as the landlord for the retail tenants on the property and sponsoring seasonal events and activities to promote the station's local businesses.

3. The station is a major retail and entertainment center, independent of its transportation role. The station hosts a nine-screen AMC theater complex, 125 stores, restaurants for regular dining and private functions, numerous casual dining vendors in the food court, a program offering food vouchers for tour groups, who visit the station, and available space for private events. Moreover, JLL actively markets the station as a retail center. There is an advertising program that promotes the station as a shopping mall. Tourist guidebooks to Washington, DC, list the station as a suggested shopping venue. Studies of the consumer demographics of the station indicate that 59 percent of all visitors are local area residents and office workers. The average household income is $61,933 and the average age is just under 36 years.


Source: Union Station Venture Ltd.

**Figure 12. Union Station Advertisement**

11 Information provided by Union Station web site, www.unionstation.com and Jones Lang LaSalle. Additional information provided by the Project for Public Spaces.

4. The configuration of retail space in the station supports entrepreneurial activities as it supports smaller scale retail operations such as start-ups and artists/craftspeople. The station has devoted a portion of its retail space to movable, mahogany counter-height retail kiosks that vendors can lease from 60 days to 12 months, minimizing the retailer's financial risk and commitment. Some businesses that have begun in the kiosks have moved into permanent space elsewhere in the station.

In total, these efforts have paid off in the Union Station case. The station's occupancy rate was over 96 percent in 2000 with annual sales exceeding $105 million. Hundreds of jobs have been created within the station. Moreover, the success of the station has spurred additional development, both public and private, in the vicinity. An area of blight has been transformed into an economic asset for both the local neighborhood and the broader metropolitan region.

While the Union Station case is a particular success story, there are numerous examples in large metro areas and small communities of how rail and station investment can trigger commercial development in the area surrounding the rail facility.

Rail and station investment do not cause private investment; they do focus the development, however. Examples of commercial development that have been attracted by station investment include:

- *Boston, Massachusetts*: Nearly $2 billion in commercial development is planned around South Station due to *Acela* high-speed rail and MBTA commuter service.[12]
- *Providence, Rhode Island*: A major shopping mall was built adjacent to the station, and a convention center was also built near the station.
- *New London, Connecticut*: Pfizer's world headquarters and major city redevelopment projects are adjacent to the station.
- *Meridian, Mississippi*: A $6.8 million investment renovated Meridian's Union Station, which opened in December 1997. The station is an intermodal facility housing Amtrak, Greyhound, and the city transit service. There is additional space in the station for meeting and convention space. Prior to the start of the construction, the adjacent blocks were struggling and contained several vacant structures. Since completion, over $10 million in private investment has been made within two blocks of the station.[13]

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12 Boston, Providence, and New London examples contained in the written statement of George D. Warrington, President and CEO, Amtrak, before the Senate Committee on Commerce, Science, and Transportation at the field hearing on rail passenger service in Georgia, December 6, 2000.

13 "Meridan Union Station Case Study," Great American Stateion Foundation, Las Vegas, New Mexico. See also, Communities Benefit! The Social and Economic Benefits of Transportation Enhancements.

- *Kansas City, Missouri*: Between 1997 and 1999, an estimated $250 million was invested in construction costs, development fees and public relations campaigns to build and restore the local Union Station. The new station offers several restaurants and retail outlets. In addition, the Kansas City Museum located a science museum within the station. More than 1.3 million people visited during the first year to see the building's interactive science museum, planetarium, and laser-light show. The station also rents space for conventions, civic celebrations, and weddings.[14]

- *Solana Beach, California*: When nearby Del Mar refused to upgrade their rail station to accommodate San Diego's new commuter trains, Solana Beach (pop. 15,000) stepped in. Six years after the new station opened, the area surrounding the Solana station is flourishing. Commercial space rents have risen sharply and vacancies are low. There are sidewalk cafes and specialty retail venues in the vicinity of the station where once there were none.[15]

- *Danville, Virginia*: Danville's station underwent a $5 million restoration to modernize the Amtrak space and incorporate a branch of the Science Museum of Virginia. Completed in December 1995, the station is focusing business interest and investment in the area. The Science Center museum generates entry fees of about $3,000 per month.[16]

- *Seattle, Washington*: King Street Station is being developed into a transportation center that is envisioned to link intercity rail, commuter rail, light rail, the extended Seattle monorail, local and regional bus service, the extended waterfront trolley, and ferry system access. In addition, it will be the transportation hub to serve Safeco Field, the new Seahawks stadium. To date, there has been one million square feet of office space constructed, and projects totaling another $1 billion of additional private development have been proposed for what is now the north lot of the old Kingdome.[17]

## Government Revenues

To the degree that employment and incomes rise, personal income tax collections will increase as well. Moreover, increased income among residents and spending by a grow-

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14 Highfill, Kevin. "The Economic Impacts of the Renovation of Kansas City's Union Station," Research and Planning, Missouri Department of Economic Development, Jefferson City, Missouri. See also, "Stationhouse Gamble," *Governing*, April 2001.

15 "Pacific Surfliner Hits Solana Beach with a Splash," Great American Station Foundation, Las Vegas, New Mexico.

16 Restoration of U.S. Railroad Stations: Catalysts for Economic Development. Presentation by Harriet Parcells, American Passenger Rail Coalition. See also, "Economic Impact of Station Revitalization," 2001, The Great American Station Foundation, Las Vegas, New Mexico.

17 Information provided by Washington State DOT.

ing tourist trade will create additional retail transactions, adding to government tax revenues. Finally, private development around the station increases the tax base for property tax collections and further bolsters government coffers.

### *Amenity Gains*

Aside from the most visible benefits of passenger rail such as employment gains, enhanced property values around stations, and the increased tax receipts that stem from this enhanced economic activity, intercity passenger rail has the potential to provide important, though less tangible, benefits to corridor economies. These so-called amenity benefits include needed capacity in congested highway corridors, fewer accidents, and reduced pollution emissions. In total these are benefits that accrue to the economy as a whole, including non-users. In short, these latter benefits help make a corridor's economy more competitive in attracting households and businesses.

As businesses become more mobile, an urban economy's success will increasingly rely on its ability to attract residents. Quality of life factors will play a greater role in households' location decisions as choosing a nice place to live is among an individual's leading consumption choices. As incomes continue to rise, people will increasingly value their time. Thus, locations that permit faster rates of travel and foster mobility will be more competitive in attracting households.

Over the past 20 years, the nation's population has increased by one-fifth, but intercity travel more than doubled. Over that same period, lane miles increased by only three percent leading to congestion and losses due to travel delays.[18] The Texas Transportation Institute estimates that traffic congestion is costing the United States economy $78 billion annually, up from $66 billion in 1996. Moreover, congestion is not just a big city issue. Drivers in small- to medium-sized cities have seen traffic delays increase much more quickly than in large cities. This reflects the underlying pattern of metropolitan growth in the United States between 1990 and 2000 population growth was strongest in medium-sized metro areas.

To the degree that rail service diverts travelers from other modes, it reduces the congestion costs for those travelers who continue to use air and auto. Finally, there are environmental benefits. Across a spectrum of pollutants, rail is generally less harmful than automobiles. To the degree that rail service diverts potential auto trips, it reduces deterioration in the environmental quality of corridor communities.

18 "Potential of Rail in Georgia and the Southeast," Statement of Jolene M. Molitoris, Administrator FRA, before the Committee on Commerce, Science, and Transportation, U.S. Senate, December 6, 2000.

**Table 5. Emission Rates: Grams per Passenger Mile**

| | Auto | Airplane | Rail |
|---|---|---|---|
| $CO_2$ | 250 | 160 | 230 |
| Volatile Organic Compounds | 2.68 | 0.145 | 0.16 |
| CO | 16.4 | 0.461 | 0.6 |
| NOX | 0.9 | 0.209 | 0.9 |
| Particulate Matter | 0.008 | not available | 0.08 |
| Road Dust | 0.879 | not applicable | not applicable |
| $SO_X$ | 0.027 | not available | 0.051 |

Source: PNWRC Intercity Passenger Rail Program, September 1998, p. 20.

## Why Focus on Corridors?

In the context of intercity travel, many of these potential economic benefits are fostered through a corridor-focused strategy, because the rail corridor links those metropolitan economies that have particularly close economic ties. Unlike commuter rail, which primarily links the central city and suburban portions of a single-labor market, regional corridor train service connects several metropolitan labor markets together.

In the past decade, as the nation's largest metropolitan areas have begun to extend their reach and as their suburbs have developed their own commercial centers, commuter rail has begun to tap nearby cities, taking on the characteristics of an intercity corridor by consequence, if not by design. For example, strong demand west of Boston has led to a commuter rail extension to Worcester.[19] Traffic snarls due to the Big Dig construction project and parking rates that top $20 per day in the downtown, are leading transportation consumers to demand a portfolio of choices for their daily travel. The recently added *Downeaster* rail service that connects Boston and Portland should intensify growth along that corridor.

Patterns of growth among United States metropolitan economies suggest that such developments will continue, creating a role for rail corridor investment in regional transportation plans. Over 80 percent of the nation's population now lives in a metro area. One of the most successful rail corridors currently in existence is the *Hiawatha*, which connects Milwaukee to Chicago. The corridor is comprised geographically of four contiguous metro areas. In Delaware, where the state has only 24.3 miles of the Northeast Corridor within its borders, the Wilmington train station is the 11th busiest Amtrak station in the United States as business travelers use it as a convenient means to travel to New York and Washington, DC.[20]

19 "All Aboard," *Regional Review,* Federal Reserve Bank of Boston, 1999, no. 1.

20 Remarks by Nathan Hayward III, Secretary, Delaware Department of Transportation, to the Amtrak Reform Council, Newark, NJ, June 26, 2001.

While the volume of growth has triggered the search for additional travel options, it is the pattern of growth that suggests a corridor-focused strategy. The population density of the metropolitan United States is dropping. A study by the Brookings Institution found that the metropolitan density of the United States declined from 5.00 persons per urbanized acre in 1982 to 4.22 person per urbanized acre in 1997, a drop of just under 16 percent.[21] This drop is taking place as metropolitan areas grow towards one another and increase their economic linkages with their neighbors. For example, the New York Consolidated Metropolitan Area extends from Connecticut to Pennsylvania. By definition, this is a region composed of a core area containing a large population nucleus, together with adjacent communities having a high degree of economic and social integration with that core. The population density and economic and social integration of this region underly the success of the Northeast Corridor, Amtrak's most successful route by far.

Such high degrees of economic integration are not confined to the Northeast. A study by the Chicago Federal Reserve bank found that over a third of commodity flows in the industrial Midwest states of Illinois, Indiana, Michigan, Ohio, and Wisconsin were exported to one of the other four states in the region.[22] Reliance on regional imports was even higher, averaging just under 40 percent. Though these figures are for commodities and exclude labor-intensive service ties, they suggest a high degree of business interlinkage within the region that would support and profit from a corridor-focused investment strategy.

21 Fulton, William, Rolf Pendall, Mai Nguyen, and Alicia Harrison, "Who Sprawls Most? How Growth Patterns Differ Across the U.S." Center of Urban and Metropolitan Policy, The Brookings Institution, July 2001.

22 "Interstate Trade Among Midwest Economies," *Chicago Fed Letter,* May 1998, Number 129.

# III. Long-Distance Markets

## Market/System Characteristics

The long-distance passenger market, as defined in this report, is served by trains traveling more than 500 miles, and operating with sleeping cars when traveling overnight. Although some corridor services provide end-to-end train journeys exceeding 500 miles,[23] long-distance trains are set apart by their much longer average passenger trip length:

- Long-Distance Average Trip 500–1,200 miles on most routes
- Corridor Average Trip Less than 250 miles on most routes

While long-distance trains may provide service in corridor markets, their schedule is often oriented around the needs of the endpoint passenger. They are generally scheduled to serve major cities and tourist destinations at attractive times, but most markets are limited to one round trip per day, or even less than daily service.[24] The result is that many small cities, and even some major cities, often have their only train service in the middle of the night. In addition, longer train routes often are characterized by lower on-time performance since there are more opportunities for delays while traveling over congested freight and commuter railroads. For corridor markets, the result is train service that is often too unreliable to attract large numbers of local passengers.

However, as discussed in the long-distance train profile provided at the end of this report, long-distance trains serve a basic transportation role in many markets throughout the United States. This includes important markets that are not served by corridor trains as well as markets where long-distance trains supplement corridor train services by providing additional round trips at key times of the day. Most of this basic "corridor" travel on long-distance trains is in coach class. The first class sleeping car service provided on long-distance trains is typically oriented toward longer, overnight travel markets.

Amtrak's current long-distance trains in the color-coded map and table that follow:[25]

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23 Current Amtrak corridor routes exceeding 500 miles include the *Vermonter* (New York–St. Albans), *Acela Regional* (Boston–Newport News), *Maple Leaf* (New York–Toronto), *International* (Chicago–Toronto), and *Carolinian* (New York–Charlotte). The majority of passengers on these routes do not travel the entire route.

24 Some markets have as many as three round trips per day, such as New York–Miami (three) and New York–Chicago (two). However, the multiple frequencies in these markets use different routes and make different intermediate station stops between the cities.

25 The *Kentucky Cardinal* and *Twilight Shoreliner,* sometimes classified as long-distance trains, are excluded from this analysis. While both have sleeping car accommodation, the services are relatively short in total distance. In addition, the *Twilight Shoreliner* historical data are combined with corridor trains, and the *Kentucky Cardinal* is a recent extension of a previous corridor train.

The long-distance trains almost all operate with sleeping cars, coach seats with extra legroom more conducive to long travel, full-service dining cars, lounge cars and baggage service.[26] In addition, extra services are provided on a few routes. The *Auto Train* carries passengers' automobiles, minivans, and motorcycles, especially targeting the large numbers of vacation and part-year residents traveling between the Northeast and Florida. The *Coast Starlight* offers enhanced first-class service providing wine and cheese-tasting in a special lounge car that is also equipped with a surround-sound movie theater. The coach section of the train also includes a kiddie car, a play area for children equipped with children's videos and various toys.

### Table 6. Ridership by Market

| | FY 1996 | FY 2001 | Percent Change |
|---|---|---|---|
| **Long-Distance** | 4.0 million | 3.9 million | –2.9% |
| **Corridor** | 15.5 million | 19.4 million | +25.5% |
| **Total**[27] | 19.6 million | 23.5 million | +19.8% |

Long-distance ridership makes up about 17 percent of Amtrak's total. However, these long-distance passengers travel about 50 percent of Amtrak's total passenger miles.[28] Since FY 1996, Amtrak's long-distance trains have not seen ridership growth comparable to corridor trains. This situation has many explanations, including:

- Elimination of routes—Two long-distance routes were eliminated during the six-year time period. These were the *Pioneer,* a (Chicago)–Denver–Boise–Portland–Seattle train, and the Desert Wind, a (Chicago)–Salt Lake City–Las Vegas–Los Angeles train. This contrasts with the expansion of corridor services during the same period, with many additional train frequencies being added to corridors. Many of these frequency increases were funded in part by state operating support.

- *Capacity limitations during periods of peak demand*—Most long-distance trains are frequently sold out during summer and other peak seasons. Lack of additional equipment limits ridership growth when most passengers would like to travel. Long-distance trains generally experience greater swings in ridership than corridor trains since the majority of long-distance passengers are on vacation or discretionary trips.

26 The one exception is the *Pennsylvanian,* which provides service with coaches and cafe car only.

27 Total includes special trains (trains which are operated on a charter basis).

28 A passenger mile is one passenger traveling one mile.

### Amtrak's Long-Distance Trains Key

| Route Name[29] | Cities Served |
|---|---|
| *Auto Train* | Lorton, VA–Sanford, FL (DC area to Orlando) |
| *Cardinal* | Washington, DC–Chicago, IL via WV |
| *California Zephyr* | Chicago, IL–SF Bay Area, CA via Denver and Salt Lake City |
| *Capitol Limited* | Washington, DC–Chicago, IL via Pittsburgh and Cleveland |
| *City of New Orleans* | Chicago, IL–New Orleans, LA via Memphis and Jackson |
| *Crescent* | New York, NY–New Orleans, LA via DC and Atlanta |
| *Coast Starlight* | Seattle, WA–Los Angeles, CA via Portland and SF Bay Area |
| *Empire Builder* | Chicago, IL–Seattle, WA/Portland, OR via Minneapolis |
| *Lake Shore Limited* | Boston, MA/New York, NY-Chicago, IL via Buffalo |
| *Pennsylvanian*[30] | Philadelphia, PA–Chicago, IL via Pittsburgh and Cleveland |
| *Silver Meteor* | New York, NY–Miami, FL via Charleston and Orlando |
| *Silver Palm* | New York, NY–Miami, FL via Charleston and Tampa |
| *Silver Star* | New York, NY–Miami, FL via Raleigh and Orlando |
| *Southwest Chief* | Chicago, IL–Los Angeles, CA via Kansas City and Albuquerque |
| *Sunset Limited* | Orlando, FL–Los Angeles, CA via New Orleans and Houston |
| *Texas Eagle* | Chicago, IL–San Antonio, TX via St. Louis and Dallas/Ft. Worth[31] |
| *Three Rivers* | New York, NY–Chicago, IL via Pittsburgh |

Overall, long-distance trains capture a relatively small segment of the long-distance passenger market—less than half of one percent.[32] However, long-distance trains do serve four unique roles:

- *National connectivity*—Collectively, long-distance trains form most of the national intercity passenger rail network that links different services and markets throughout the United States. The preservation of a national network of intercity passenger train service was one of the key reasons that Amtrak was created. Unfortunately, service elimination/reductions and declining on-time performance have reduced the effectiveness of this national network in recent years.

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29 *Auto Train* is not shown in the map to the right. The train runs from Lorton, VA, to Stanford, FL, over the same route as the *Silver Meteor.*

30 The *Pennsylvanian* does not show on the map since it operates over the same route as do parts of *Three Rivers,* the *Capitol Limited,* and the *Lake Shore Limited,* which are shown.

31 Coach and sleeping cars connect to *Sunset Limited* in San Antonio from the *Texas Eagle* to allow through service between Chicago and Los Angeles.

32 The long-distance passenger market is defined as trips over 500 miles. The passenger market includes air, rail, bus, and auto transportation.


**Figure 13. Long-Distance Passenger Trains Serve the United States**

- *Essential services*—Many long-distance trains serve small communities with limited or no significant air or bus service, especially in remote or isolated areas such as northern Montana and central West Virginia. As a result, rail transportation may provide the only affordable public transportation in such communities.

- *Redundancy to the transportation system*—Long-distance trains provide an alternative form of travel during periods of severe weather conditions or emergencies that affect other modes of transportation. This was recently demonstrated in the September 11 terrorist attacks that crippled air travel.

- *Transporting mail and express*—Nearly all Amtrak long-distance routes carry a substantial amount of mail for the U.S. Postal Service, as well as other types of express (less-than-truckload freight). This service provides extra capacity for the U.S. Postal Service during holiday rush periods in particular, at a time when other modes are already at maximum capacity.

Amtrak's long-distance train services and needs are discussed in further detail following the corridor profiles at the end of this document.

# IV. Institutional Challenges

## Background of State Involvement in Intercity Passenger Rail Service

The financial problems experienced by the United States railroad industry in the 1960s and early 1970s left the nation's rail passenger system, then operated by the freight railroads, undercapitalized and a secondary concern to railroad management during that period.

Amtrak was created through enactment of the Railroad Passenger Service Act in October 1970 (P.L.91-518) and began operations on May 1, 1971. At its inception Amtrak operated 184 trains over a 23,000-mile network. This was less than half of the approximately 440 passenger trains previously operated.

The creation of Amtrak by the federal government provided the management focus necessary to revitalize intercity rail travel, but federal transportation funding priorities at that time were aimed at completing the interstate highway system, establishing urban transit systems and, to some extent, preserving rail freight service in the Northeast and Midwest through the Final System Plan and creation of Conrail in 1976.

Despite the lack of federal financial assistance, as early as the 1970s states recognized the need to preserve and invest in intercity rail passenger services. In light of the severe reductions of core system routes, the states' first priority was to continue routes essential to their constituencies.

Through section 403(b) of the Rail Passenger Service Act, states could retain services not included in Amtrak's core system or introduce a new Amtrak service by paying part of the losses incurred by that service. These state-supported passenger services have steadily increased in number and cost since Amtrak's early years. Today, states subsidize 18 routes at a total cost of over $123 million annually.

In addition to subsidizing passenger operations, states participated in capital programs with Amtrak before the 1990s without the assistance of federal funding using primarily state resources. For example:

- New York state invested over $95 million in the mid-1970s to improve trackage, passenger stations, and equipment for its *Empire* Corridor service, establishing 110-mph service between Albany and New York City.
- California has been making significant investments since the mid-1970s in equipment and facilities for the corridor linking the Bay Area, Los Angeles, and San Diego, as well as connecting routes to Sacramento.

- Michigan has invested over $47 million in track and equipment on the Detroit–Chicago route. When combined with local resources, a total of $79 million has been invested to incrementally upgrade the route to high-speed rail standards.
- Illinois has invested over $80 million in state funds on a 120-mile segment of the Union Pacific corridor between Chicago and St. Louis to provide 110 mph high-speed rail service. Total capital improvements on the corridor amount to $130 million.

Since the 1990s, the number of states involved in capital planning and implementing capital projects has increased significantly. As outlined in the intercity rail corridor profiles, the level of state past investment and existing commitments to corridor improvements alone now exceeds $4 billion.

## Federal Assistance Available for Intercity Rail Passenger Improvements

In the Rail Passenger Service Act, Congress instructed the Secretary of Transportation to take into account the need for expeditious intercity rail passenger service within and between all regions of the continental United States in recommending the basic rail passenger system. Unfortunately, when Congress established Amtrak, it did not provide the necessary resources to carry out this mandate. Amtrak began with obsolete equipment, stations in need of repair and a high-cost structure.

Except for Amtrak's annual budget appropriations, no federal programs were available to help states preserve and improve the intercity rail passenger system until the early 1990s. While the programs have provided some assistance to states in their efforts to establish and improve intercity rail corridors and some successes in technology development, in general they have been limited in scope and funding as noted below:[33]

- *The Intermodal Surface Transportation Efficiency Act of 1991* (ISTEA)—Section 1010 of this Act provided $5 million annually (1992–1997) from the Federal Highway Administration's Surface Transportation Program for elimination of hazardous railway–highway crossings on five high-speed rail corridors selected by the Secretary of Transportation. Section 1103(c) of the Transportation Equity Act for the 21st Century (TEA-21) expanded the number of corridors eligible for these funds from five to eleven, and increased the annual funding level (FY 1998–2002) from $5 million to $5.25 million.[34] While an additional $15 million per year

[33] This discussion excludes the funding authorized and provided for magnetic levitation (MAGLEV) development, and that provided for the Operation Lifesaver program.

[34] An important point to note is that while Section 1010 of ISTEA authorized the Secretary to designate a number of high-speed rail corridors, and these designations were expanded in Section 1103(c) of TEA-21, to date this "federal designation" is a prerequisite *only* for receipt of the railway–highway crossing funding. Proposals now before Congress would use these corridor designations as the basis for access to additional funding.

was authorized, it has never been appropriated. Since this funding had to be divided among the eligible corridors, and typical grade separation projects on heavily used rail lines usually involve multi-million dollar investments, the impact of these funds on the national corridor program has been limited. In addition, the funding has been earmarked in recent years.

ISTEA also required the Department of Transportation to establish a Technology Demonstration Program and a Research and Development Program "to foster the implementation of magnetic levitation and high-speed steel wheel on rail transportation systems as alternatives to existing transportation systems." For these programs, $5 million was authorized from the Highway Trust Fund for each of Federal Fiscal Years 1992 to 1997. In addition, ISTEA authorized $25 million in general funds for the national high-speed ground transportation technology demonstration program and $25 million for national high-speed ground transportation research and development. The policy and funding established in ISTEA were the basis for the formation of the Federal Railroad Administration's Next Generation High-Speed Rail Program initiated in 1993.

- *The Next Generation High-Speed Rail Program,* initially funded with the $5 million in Highway Trust Funds provided in ISTEA, was then supplemented by passage of the Swift Rail Act of 1994 (Swift Act). The Swift Act authorized the Secretary of Transportation to provide financial assistance for up to 50 percent of the publicly financed costs for rail passenger corridor planning activities in designated high-speed rail corridors, excluding the Northeast Corridor. The Act also authorized the Secretary to undertake activities for the improvement, adaptation, and integration of proven technologies for commercial application in high-speed rail service. Initial Swift Act authorizations were as follows:

| Year | 1995 | 1996 | 1997 |
|---|---|---|---|
| Planning | | $10M | $45M |
| Technology | | $25M | $40M |
| **Total** | **$29M*** | **$35M** | **$85M** |

* The 1995 authorization was not split between Planning and Technology.

Swift Act authorizations were extended for Federal Fiscal Years 1998–2001 in TEA-21:

| Year | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|---|
| Planning | $10M | $10M | $10M | $10M | $0 | $0 |
| Technology | $25M | $25M | $25M | $25M | | |
| **Total** | **$35M** | **$35M** | **$35M** | **$35M** | **$0** | **$0** |

Tracking appropriations against authorizations from these programs is complicated because the funding provided in ISTEA mixes with the Swift Act funding, and the $5 million in Highway Trust Fund authorizations from ISTEA was rescinded prior to the end of ISTEA. Since 1996, all appropriations for the Next Generation High-Speed Rail Program have come from the General Fund. A total of $192 million has been appropriated for the Next Generation High-Speed Rail Program between 1993 and 2002, though most of this funding has been earmarked in the past three years.

Currently, approximately three to four million dollars per year of the Next Generation High-Speed Rail funds is designated for corridor planning. These funds require a high match requirement (50 percent) and cannot be used for planning on the Northeast Corridor. These constraints restrict the number of states that can use the funds and the purposes for which the funds can be used.

Most of the federal funding made available for this program in recent years, (approximately $20 to $25 million) has been in the area of technology development. One justification for allocating most of the federal funds for this purpose was that no single state or region in isolation could afford the necessary technology development efforts. By working with state and railroad partners, the federal effort would provide a real-world environment for the application of technologies that would prepare the way for a smooth introduction when states were ready to implement their corridor systems.

Indeed, states have taken advantage of these funds to develop a number of state-led innovative advances in rail passenger safety and service. Examples of these advances include:

- *Advanced Train Control Systems*—Michigan DOT, in partnership with Amtrak and FRA has implemented this advanced communications signal system on an 80-mile segment of Amtrak-owned portion of the Detroit–Chicago route between Kalamazoo, MI, and the Indiana state line. To permit high-speed operation, the Incremental Train Control System (ITCS), utilizing the route data base, communicates with crossings and ensures that gates are lowered with adequate time to clear the crossing prior to the arrival of a train. ITCS confirms that the gates have been lowered and only permits the train to operate at high-speed if everything is operating properly. In addition to enhancing safety, this technology has also allowed an increase in train speeds to 90 mph with a target of 110 mph when all safety verification analyses are completed.
- Illinois is working with the Federal Railroad Administration and the Association of American Railroads to develop a high-tech, computer-based signal system, which is expected to be the industry standard for train control. The system will allow for cost-effective positive train control for mixed passenger and freight operations. By enforcing train movements and speed restrictions for PTC-equipped trains, the system will accomplish the core PTC functions of preventing train collisions, over-speed derailments, and protecting track workers.

California and Washington are also involved in positive train control projects.

- *Sealed Corridor Projects*—Both North Carolina and Pennsylvania DOTs have implemented far-reaching grade crossing safety improvement projects on their future high-speed rail corridors. North Carolina has installed long-gate arms, four quadrant gates, and median separators, including various combinations, which have significantly reduced incidents of highway vehicles driving around grade crossing gates. The Sealed Corridor project, which initially focused improvements on the NCRR mainline from Charlotte to Salisbury has since been extended eastward to Durham. Pennsylvania is advancing a multi-year program to close the remaining three public highway grade crossings over the 104-mile *Keystone* Corridor between Philadelphia and Harrisburg.
- *Equipment Upgrades*—New York has utilized the Next Generation High-Speed Rail Technology Program to rehabilitate and remanufacture RTL Turboliners, dual powered trainsets capable of operating at 125 mph for use on the *Empire* Corridor. Wisconsin is also evaluating non-electric locomotive technology for use throughout the Midwest High-Speed Rail Corridor.
- *The Transportation Equity Act for the 21st Century* (TEA-21)—In addition to extending the Swift Act and expanding on the railway–highway grade crossing program, TEA-21 created the Transportation Infrastructure Finance and Innovation Act (TIFIA) program. Under TIFIA, the Department of Transportation can provide credit assistance (not grants) to public and private sponsors of major (generally in excess of $100 million) surface transportation projects of regional or national significance, including rail projects. A total of $530 million of contract authority (FY 1999, $80M, FY 2000, $90M, FY 2001, $110M, FY 2002, $120M, FY 2003, $130M) is provided to pay the "subsidy cost" of supporting federal credit under TIFIA. While rail is an eligible activity under this program, and rail projects have received credit assistance (e.g., in FY 2000, New York's Pennsylvania Station Redevelopment project received a $140 million loan and a $20 million line of credit), this program does not provide a direct federal subsidy.

Federal assistance programs for passenger rail, although beneficial to the states, have nevertheless fallen far short in meeting the needs of the states with respect to developing intercity rail passenger corridors. The programs have provided significantly less funding than provided by states themselves. The programs have also had restrictions on their use for basic rail infrastructure improvements.

With regard to annual federal operating and capital assistance for Amtrak, annual authorization levels, and even lower appropriation levels, have not provided Amtrak the resources necessary to address operating shortfalls and upgrade infrastructure and equipment. The inability to maintain its capital plant has constrained Amtrak ridership on popular routes and led to poor service and passenger complaints on other routes. As a result,

Amtrak has been unable to progress towards financial self-sufficiency or to assist states in developing additional competitive rail passenger corridors. Furthermore, the viability of connecting cross-country routes has been threatened.

In addition to these federal programs and annual budget appropriations, the only funding made available for intercity rail passenger capital needs has been the Taxpayer Relief Act of 1997 that provided a so-called tax refund to Amtrak of approximately $2.3 billion. These programs and appropriations have not provided funding levels commensurate with the nearly $60 billion of identified rail intercity passenger needs.

The many years of underfunded capital programs and increasing operating deficits have not only impacted Amtrak, but have also negatively affected states' corridor development efforts. In a number of cases Amtrak has been forced to notify its partner states that it can no longer meet past financial commitments it has made for large-scale capital programs on rail passenger corridors. This is not only detrimental to the nation's overall transportation system with regard to capacity and mobility, but also puts past, present, and prospective state investments at risk.

The significantly lower level of participation by the federal government in rail passenger investment, as compared to other modes of transportation, is striking. For FFY02, for example, a year that is representative of the proportions of federal funding for the various modes, Congress appropriated approximately $32 billion for highways, $6.3 billion for transit, $3.3 billion for airports and $521 million for Amtrak, about 1.2 percent of the total.

## Recent Legislative Proposals to Fund Passenger Rail

Several important bills that would provide funding for intercity rail passenger investment were introduced in the 107th Congress, including:

- *House: H.R. 2950, The Railroad Infrastructure Development and Expansion Act for the 21st Century* (RIDE 21). This bill, introduced by Congressman Don Young (D-AK), Chairman of the House Committee on Transportation and Infrastructure, would provide $25 billion over 10 years for high-speed rail infrastructure development through a combination of tax-exempt ($12 billion) and tax credit ($12 billion) bonds. The tax-exempt bond provisions would allow states to issue federal tax exempt bonds. The tax credit provisions would allow states to bond for high-speed passenger rail infrastructure improvements, paying for these projects through a minimum 20 percent cash investment by the states, and providing the investor with income tax credits in lieu of interest. The tax credit proposal, far less costly to the states than tax exempt bonding, was also included in free-standing legislation, HR 2329, the High-Speed Rail Investment Act.

RIDE-21 would also reauthorize the Swift Act from 2002 through 2009, providing $30 million annually for technology development, and $70 million per year for corridor development (previously corridor planning.) Finally, the bill provides an additional $35 billion over 10 years in credit and loan assistance for freight rail improvements.

- *House: HR 4545, the Amtrak Reauthorization Act of 2002.* This bill, a one-year Amtrak reauthorization introduced by Congressman Don Young (D-AK), would provide $1.2 billion for Amtrak and $775 million in safety and security investments for FY 2003.
- *Senate: S.1991, the National Defense Rail Act.* This bill, introduced by Senator Ernest F. Hollings (D-SC) Chairman of the Senate Commerce, Science and Transportation Committee, would provide a comprehensive passenger rail investment package. It would reauthorize Amtrak for five years, FY 2003–2007, providing both capital and operating assistance. It would also remove the operating self-sufficiency requirement from Amtrak, and provide $3.6 billion annually (FY 03–07) for rail passenger service investment, including $0.85 billion in operating assistance to support existing long-distance and short-distance trains, $1.3 billion annually for capital investments in the Northeast Corridor, and $1.5 billion (with no required match) for the development of high-speed rail corridors.

In addition S.1991 would reauthorize Swift Act funding at $25 million for planning and $25 million for technology development for each of fiscal years 2002 through 2008. The bill also provides $1.4 billion in one-time security improvements, and provides $35 billion in credit and loan assistance for freight rail improvements. Separate tax credit bond legislation, S.250, the High-Speed Rail Investment Act, was also introduced in the Senate.

The level of Congressional interest in rail, and the funding levels proposed are certainly much greater than what has been seen in the past. However, analysts have noted that none of these proposals provides a stable source of federal funding required for sustained investment and rail infrastructure development. The debt financing mechanisms require substantial investment and initiative on the part of the states. The Senate proposal, while not utilizing debt financing for high-speed and passenger rail improvements, would provide general fund authorizations, requiring annual and unpredictable Congressional action before the funds would be available. In a constrained budget environment, it is far from certain that these funds would be provided. Although the Congressional initiatives have been substantial and ambitious, Amtrak as a corporate entity, and the provision of federal operating assistance for intercity passenger rail in general continue to be controversial and decisive action at the federal level remains to be taken.

The states, therefore, continue to take the leadership position in planning and financing the rail intercity corridors that will reduce the need to finance additional capacity for the nation's highway and air networks. This burden, however, cannot be shouldered primarily by the states. To continue the successful growth of the rail passenger network and its resulting benefits to other modes of transportation in terms of capacity and competitive

choice, it is impossible to escape the conclusion that the federal government must provide increased and reliable levels of dedicated capital and operating assistance.

## Institutional Challenges to States

In the course of undertaking the challenge of developing rail passenger corridors, states have worked *together* through a number of organizational arrangements.

One of these is the Midwest Interstate Passenger Rail Compact Commission. The Midwest Interstate Passenger Rail Compact was created to promote the development and implementation of improvements and long-range plans for intercity passenger rail service in the Midwest, coordinate interaction among Midwest state officials, and among the public and private sector at all levels (federal, state, and local) on passenger rail issues; and support current state passenger rail efforts undertaken by state DOTs. Since intercity passenger rail is frequently an interstate endeavor, Midwestern state legislators and governors felt that the best way to promote the development of passenger rail improvements in the region at the state government level was through a compact among Midwestern states. Since most compacts must be passed by each state's legislature and signed by the governor, the Midwest Interstate Passenger Rail Compact provides structure and legitimacy to development of a unified voice among the compacting states.

Under the Midwest Regional Rail Initiative (MWRRI), the nine Midwestern states of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin, along with Amtrak and the Federal Railroad Administration have developed an implementation plan for a 3,000-mile passenger rail network hubbed on Chicago. The initiative is governed by a memorandum of understanding signed by the heads of each state transportation department and Amtrak. This plan calls for increased speeds of up to 110 mph and significant increases in service frequencies. The MWRRI plans to release a comprehensive plan update in early 2003.

The Northern New England Passenger Rail Authority was formed by the 117th Maine State Legislature in 1995 for the purpose of reinstating passenger service within and outside the state of Maine beginning with the restoration of service between Maine and Boston, MA. The five Authority Directors are appointed by the Governor and have full responsibility for the development and implementation of rail service to the region.

The Coalition of Northeastern Governors (CONEG) is a voluntary association of the northeast Governors that supports intergovernmental cooperation on a variety of issues important to the northeast. CONEG has long provided the institutional platform for the northeast states to work cooperatively with each other, the federal government and the private sector to improve passenger rail service in the region. CONEG develops information and the regionwide perspective that underlies the Governors' long-standing support for a strong federal–state partnership for safe, efficient, and reliable passenger rail service, based on institutional coordination, strong federal policy leadership, and sustained federal funding support.

The CONEG High-Speed Rail Task Force worked with Amtrak, the Federal Railroad Administration, and the private sector to identify infrastructure and equipment investments that could benefit the entire Northeast Corridor and its feeder lines—thus, contributing to the national model of a coordinated, incremental approach to development of existing passenger rail corridors. CONEG's study of the regional economic and environmental benefits of improved passenger rail service documented the broader benefits accruing from investments in high-speed passenger rail. CONEG's study of the state capital and operating support of intercity passenger rail systems provided missing information about the substantial support provided by states for intercity passenger rail—and the continuing need for strong federal funding support.

In other regions of the country, states are using different institutional arrangements to address the issues of multistate rail passenger corridors. In the Southeast, the states of Virginia and North Carolina have created the Virginia–North Carolina Interstate High-Speed Rail Commission to investigate the costs and benefits of high-speed intercity passenger rail service as part of a multi-modal approach to improve the timely, efficient, and convenient movement of people and goods. The Mid-Atlantic states along with Amtrak, Norfolk Southern, and CSX are, under the umbrella of the I-95 Coalition, developing an investment program to reduce or eliminate key rail bottlenecks (both passenger and freight) in the Mid-Atlantic transportation corridor to increase rail capacity and relieve congestion on the rail, highway, and air systems.

These organizations, and others, have worked closely with Amtrak, commuter railroads and freight railroads to plan, develop, and implement corridor infrastructure and service improvements. These relationships will continue as long as the partners are willing and able to actively participate through the provision of various operating rights and service enhancements or through financial contributions. Section 410 of the Amtrak Reform and Accountability Act of 1997 gives states the ability to enter into interstate compacts to support passenger rail service without the necessity of congressional approval. These compacts can be executed by executive agreement among the governors or their designees, such as transportation department heads or they can be legislated through adoption by the legislature of each state involved. The precise mechanism used depends on the nature of the compact agreement.

To date, these organizations have not been required to act as rail funding or operating entities. Individual states or Amtrak have served these functions for the projects or services implemented. However, given the uncertainty of Amtrak's future, or, should states decide that private operators can provide a higher or more economical level of service, significant jurisdictional challenges would face individual or groups of states in continuing to develop intercity rail passenger corridors. For instance, rail passenger franchise rights, i.e., the right to operate passenger service over lines owned by rail freight railroads, are available only to Amtrak. Without these franchise rights, states could not prevent freight carriers from increasing allocated costs to prohibitive levels or refusing to allow the continuation or establishment of new services operated by other service providers.

In addition, individual states have different legislative and budget cycles, as well as different constitutional limitations regarding investments in private entities and spending outside of their respective state boundaries. Combined with problems associated with service versus fair cost allocation between states and coordination with commuter and freight railroads, it is clear that there will be a need for continuing federal oversight and the provision of legislative tools to establish a fair and level playing field for the nation.

Should Amtrak cease to exist or undergo a radical transformation, a different and serious set of challenges would face many states that are dependent on intercity passenger service and/or have made significant investments in passenger infrastructure, equipment, or service. Although the provision of intercity rail passenger service is a federal government responsibility, if it is necessary for states to take a leadership role to preserve service, any divestiture of Amtrak infrastructure assets would have to be accompanied by an opportunity for states to acquire these assets unencumbered by liens and in a state of good repair. The importance of this need is most obvious for the Northeast Corridor, in which Amtrak owns significant assets such as trackage, bridges, tunnels, stations, and equipment.

In a similar vein, any federal actions taken toward the reauthorization or replacement of Amtrak must hold state-owned railroads (primarily commuter railroads) harmless from changes in related law, and require the federal government to honor existing Amtrak obligations to states.

## Summary

Since the inception of Amtrak, states have contributed to the development, preservation and enhancement of intercity rail passenger service, especially the establishment of rail passenger corridors. These investments have been made because states have recognized that intercity rail passenger service fulfills a vital public purpose and complements the interstate highway system and the national aviation network. Rail passenger service is critical to a safe, balanced, multi-modal national transportation system.

To date, federal operating and capital assistance programs have not provided a level of funding sufficient to meet existing operating and capital requirements, which are estimated to be approximately $60 billion over 20 years. The growth of the nation's successful rail passenger corridor system has essentially come about as a result of state initiative and investments. In light of Amtrak's recurring financial problems, debates over its future, and the need more than ever to continue to improve and expand intercity rail passenger service, it is clear that states can not bear the financial burden alone. A dedicated and reliable federal funding program is required to continue rail passenger corridor development and to preserve long-distance routes.

In addition to financing, federal commitments, and legislative measures to protect past investments and enable the continuation of multi-state corridor efforts are necessary.

In order for states to continue to persist in the development and financing of rail passenger corridors, the federal government must provide the following:

- *A strong federal funding partnership.* The federal government must take a significant role in funding the intercity rail passenger system as it has for the highway, transit, and air modes without compromising the funding for those modes. Federal funding to assist states in corridor development must be secure, predictable, and reliable, and require standard matching shares as is the case with the other modes. Continuation of long-distance, interstate connecting services should be the sole responsibility of the federal government.
- *Passenger franchise rights over freight rail lines.* These rights must allow states to maintain or establish service over rail freight lines with reasonable operating rights and limits on the level of allocated costs.
- *Protections from any divestiture or replacement of Amtrak.* States do not feel that they should bear the responsibility for continuing intercity rail passenger operations should Amtrak be unable to continue as an operating entity. However, if this became necessary to preserve essential rail passenger service, states will need basic protections from Congress. These protections must include the right of states to acquire essential Amtrak assets free of liens, encumbrances and in a state of good repair and a federal commitment to honor existing Amtrak obligations to states.

# V. Capital Investment Needs

## Capital Needs

Intercity passenger rail service development requires capital investment. This includes resources for maintaining existing fleet and infrastructure in a "state of good repair" as well as expansion/development of improved intercity passenger rail services. A "state of good repair" provides important benefits, including:

- Improved service reliability
- Improved safety and security
- Enhanced customer satisfaction
- Enhanced community role and image

As documented by each of the corridor profiles provided at the end of this report, the states have been involved in the planning and development of intercity rail corridors throughout the United States. As shown by the map below, these intercity passenger rail corridors are nationwide in scope, providing service to and benefiting from the participation of 36 states.

**Table 8. Summary of Projected Corridor Investment Needs**

| Corridors | Next 6 Years | 7–20 Years | Total |
|---|---|---|---|
| Northeast Corridor (Washington–New York–Boston) | $6,590,000,000 | $6,510,000,000 | $13,100,000,000 |
| *Keystone* Corridor (Philadelphia–Harrisburg) | $170,000,000 | $140,000,000 | $310,000,000 |
| *Keystone* Corridor Extension (to Pittsburgh) | $ – | $850,000,000 | $850,000,000 |
| *Empire* Corridor (New York–Albany–Buffalo) | $340,000,000 | $1,560,000,000 | $1,900,000,000 |
| Midwest Regional Rail Initiative (MWRRI) System–Chicago–Detroit segment | $538,000,000 | $ – | $538,000,000 |
| Midwest Regional Rail Initiative (MWRRI) System–Chicago–St. Louis segment | $500,000,000 | $ – | $500,000,000 |
| Midwest Regional Rail Initiative (MWRRI) System–Chicago–Milwaukee–Minneapolis segments | $681,500,000 | $760,400,000 | $1,441,900,000 |
| Midwest Regional Rail Initiative (MWRRI) System–other Chicago Hub corridors/extensions | $ – | $2,339,200,000 | $2,339,200,000 |
| Southeast High-Speed Rail (SEHSR) System (Washington–Richmond/Hampton Roads–Raleigh–Charlotte) | $479,400,000 | $4,300,000,000 | $4,779,400,000 |
| SEHSR Extensions (to Atlanta/Macon and Jacksonville) | $352,000,000 | $975,000,000 | $1,327,000,000 |
| Florida Corridor (statewide initiative) | $2,000,000,000 | $6,000,000,000 | $8,000,000,000 |
| *Capitol* Corridor (San Jose–Oakland–Sacramento) | $380,000,000 | $1,030,000,000 | $1,410,000,000 |
| *Pacific Surfliner* Corridor (San Luis Obispo–Los Angeles–San Diego) | $1,490,000,000 | $2,560,000,000 | $4,050,000,000 |
| *San Joaquin* Corridor (Oakland/Sacramento–Bakersfield) | $820,000,000 | $950,000,000 | $1,770,000,000 |
| California Coast Corridor (San Francisco–Los Angeles) | $590,000,000 | $320,000,000 | $910,000,000 |
| Extensions to California Corridors (Reno, Redding, Palm Springs, and Las Vegas) | $155,000,000 | 117,600,000 | $272,600,000 |
| Pacific Northwest Corridor (Vancouver–Seattle–Portland–Eugene) | $620,000,000 | $2,070,000,000 | $2,690,000,000 |
| Gulf Coast Corridor (Houston–New Orleans–Mobile and New Orleans–Atlanta) | $ – | $4,640,000,000 | $4,640,000,000 |
| Northern New England (Boston–Portland, Boston–Vermont–Montreal) | $ – | $2,500,000,000 | $2,500,000,000 |
| South Central Corridor (San Antonio–Dallas/Fort Worth–Tulsa, Dallas/Fort Worth–Little Rock) | $1,273,000,000 | $1,287,000,000 | $2,560,000,000 |
| Colorado Corridor (Front Range and I-70 West) | $ – | $4,049,784,000 | $4,049,784,000 |
| **Total** | **$16,978,900,000** | **$42,958,984,000** | **$59,937,884,000** |

Notes: Estimates for the Gulf Coast, and Northern New England corridors obtained from Amtrak.
Capital estimates for the *Keystone* Extension are based on the midpoint of a range of project estimates.
Capital estimates for the South Central Corridor are based on Amtrak's estimate of $2.56 billion total for the entire corridor.
Capital estimates for MWRRI are updates from the last published report obtained from the states.
Distribution between next six year and 7–20 year investment periods is estimated for the California Corridor Extensions.
Capital investments for Florida Corridor are based on midpoint of range for non-electric technology estimates.

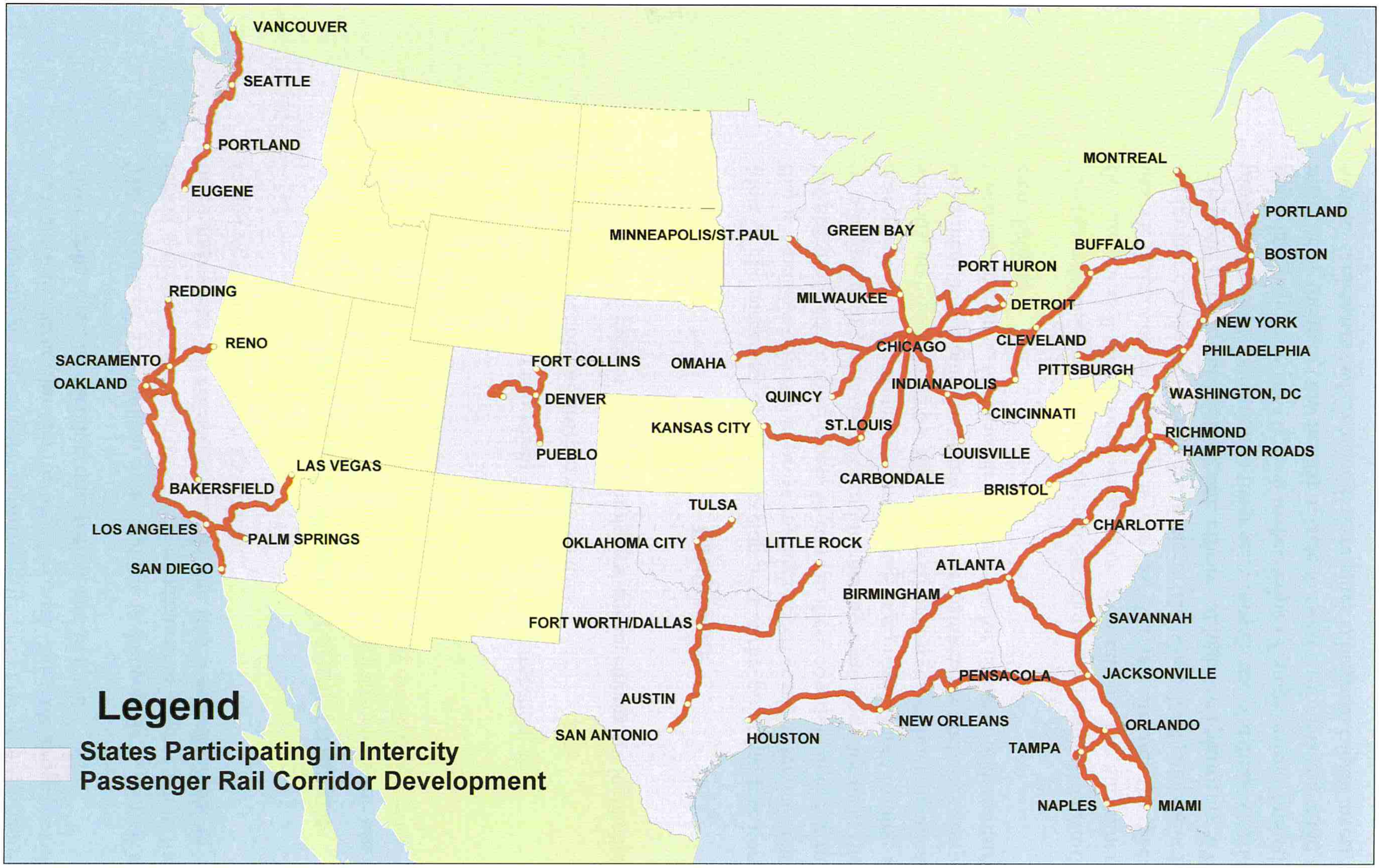


**Figure 14. Rail Corridor Development Is Nationwide in Scope**

The states and Amtrak have identified the capital investment needs for most of these corridors, focusing on incremental improvements within two time horizons-near-term (next six years) and vision (through the next 14 years). The table above provides a summary of these capital costs by corridor, time period, and in total.

The estimate of $59.9 billion derived above is comparable to Amtrak's own rough $50 billion estimate of the capital required to advance high-speed rail in the federally designated high-speed rail corridors. In total, the state estimates imply an annual estimated capital expenditure of about $3.0 billion.

## Service Delivery Transformation

Beyond simply making investments to improve infrastructure, the use of the following 21st-century technologies is required for intercity passenger service to reach its full potential. These technologies include:

- Equipment,
- Positive train control and grade crossing protection, and
- Reservation and Information Systems.

The details of each of these technological enhancements are highlighted below.

### *Equipment*

Most of the successful corridor development to this point has relied on new equipment that is especially effective in providing high-speed corridor service. The equipment that has provided service for the past 30 years in these corridors does not meet the demands of a high-volume, high-speed corridor operation and does not meet the expectations of customers. The traditional equipment does not provide rapid loading and unloading at stations, and does not allow higher speeds on curves without significant infrastructure investment, is not built for state-of the-art maintenance and does not provide sufficient customer amenities, for example power ports for laptops, modern restrooms, and sufficient lighting.

*Loading and Unloading.* Amtrak's bi-level Superliners and single-level Amfleet and Horizon fleet are not well suited for modern corridor operations. The Superliner equipment only has one main door for access to as many as 77 seats, restricting the speed with which the equipment can load and unload at stations. The single-level equipment has either one or two doors per car, but these are only efficient at high-level platforms. When no high-level platforms exist (the situation in most areas outside the Northeast Corridor), loading and unloading requires relatively slow maneuvering of steps, usually limited to doors with a member of the train crew posted outside to assist customers and avoid injuries. Building high-level platforms where none exist requires substantial capital investment.

Modern equipment addresses these access issues. Bi-level equipment designed for California (*Surfliner* and California Cars) features two wide doors on each side, and provides easy same-level access to much cheaper-to-construct, eight-inch above top-of-rail platforms. This equipment also provides better access for disabled passengers. Talgo equipment used on the Amtrak *Cascades* service also addresses the access issue by virtue of its low-level platform access and one wide door serving no more than 36 passengers.[35]

*Higher Speeds on Curves Without Major Infrastructure Investment.* Many routes have relatively slow average speeds due in part to the curve-related speed restrictions on the route. Addressing the slow sections associated with curves with traditional equipment is expensive, since track needs to be realigned to allow for increased speeds. This frequently requires expensive real estate acquisition.[36]

Modern equipment, such as the *Acela Express* and Talgo equipment, allows for higher speeds on curves without the same level of infrastructure investment. Both equipment types accomplish this through active or passive tilting. This allows a higher speed without track realignment. In the case of the Amtrak *Cascades* service, more than 10 percent of the travel time was eliminated simply through modern equipment acquisition. The success of this technology has resulted in procurement specifications for the proposed Midwest Regional Rail Initiative to include tilt requirements.

*Equipment Designed for State-of-the-Art Maintenance.* Traditional equipment is designed around expectations that it will be taken out of revenue service for maintenance. Most Amtrak equipment is currently scheduled for 120-day preventive maintenance and four-year overhauls. The result is a requirement for "protect" equipment, that is, equipment needed to provide service when other equipment is in maintenance. The traditional requirement has been between 10 percent and 25 percent more equipment than is required to meet the daily schedule. This imposes significant capital cost, and it reduces the revenue-generating capabilities of the equipment.

Modern equipment is designed to allow a great deal more modular maintenance, reducing, or even eliminating the need for "protect." This has been the experience with the Amtrak *Cascades* service, which uses Talgo equipment. The modular components on this equipment allow all maintenance and overhaul to be provided during an ordinary overnight layover. Also, the equipment is maintained using a preventative philosophy based on detailed manufacturer knowledge of the optimal life of each part and compo-

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35 Talgo equipment is roughly half the size and capacity of standard single-level equipment due to its design. Each car piggybacks on the car in the front of it, sharing the wheel-set, and contributing to its lightweight design.

36 Curve speeds are currently designed based on a compromise between the needs of freight and passenger trains. For passenger comfort and safety, curves feature super-elevated track (one rail higher than the other). Passenger trains usually operate at higher speed around curves that freight trains. However, too great a difference in speed causes very expensive maintenance to the curve track since slower-moving freight trains will wear down the rail.

nent. Parts are replaced or overhauled according to strict guidelines. While upfront costs may seem high, life-cycle costs are significantly reduced. To date, the equipment has had a 99.9 percent availability rate. This has allowed the service to be operated with no "protect" equipment, and saved significantly on capital costs.

*Equipment Designed with Upgraded Amenities.* Traditional equipment does not meet current customer amenity expectations. The lighting quality is poor on old equipment; group seating is not equipped with conference tables; restrooms are generally small and unattractive; and, power points for laptop computers are limited or non-existent.

Modern equipment, such as that used on *Acela Express* and the *Pacific Surfliner* addresses these issues. Power points are provided at each seat, lighting is improved through use of halogen lighting, restrooms are larger and more attractive, and tables are interspersed throughout the cars, allowing for group meetings. These amenities are important in satisfying the expectations of 21st century customers, and essential to ridership growth.

## Positive Train Control and Grade-Crossing Protection

Traditional infrastructure improvements to create high-speed corridors required extensive separation of highways and railroad infrastructure, as well as major investments in signaling and additional track capacity. These investments are expensive, but modern technology has reduced the costs substantially.

Separation of highway and rail traffic previously required grade crossings to be eliminated through either bridge construction or closure. A number of initiatives underway throughout the United States are providing alternatives in corridors designed for 110 mph or less. North Carolina has a sealed corridor program that has utilized four quadrant gates, median separators, and video monitoring of crossings. The number of crossing violations has been greatly reduced. Michigan has completed installation of Incremental Train Control (ITCS) technology that utilizes "smart" grade crossings that communicate the presence of vehicles to the train after the crossing gates are lowered, allowing the emergency brakes to be applied with sufficient stopping distance to avoid an accident. Both of these approaches make higher speeds possible with lower cost.

The Michigan ITCS program allows train control as an overlay to the signaling system, and does not cost as much as the signaling systems developed for traditional high-speed rail. A positive train control (PTC) technology under test in Illinois also provides opportunities for increasing track capacity and allowing for high-speed operation. In the case of PTC, global positioning systems and transponders are used to enforce the movement authority of trains and speed restrictions. By allowing trains to follow each other based on safe stopping distances rather than geographic distances, more trains traveling at varying speeds can travel over existing track than under traditional signaling systems.

### Reservations and Information Systems

Modern reservations and information systems have the potential to improve the revenue of train operations. Web technology has already been improving the revenue of Amtrak, and it does so at much lower cost than other methods of selling tickets. In addition, yield management techniques used to manage airline sales have the potential to increase revenue on intercity passenger rail service. The current yield management systems in place do not have the level of sophistication to optimize revenue.

# VI. Corridor Profiles

The following subsections present detailed information on a number of existing and proposed intercity passenger rail corridors throughout the United States

## Northeast Corridor Profile

The *Northeast Corridor* stretches from Washington, DC, in the south to Boston, MA, in the north (see map on next page). It is a multiple track, electrified railroad 80 percent operated and owned by Amtrak. Segments between New Rochelle (north of New York City) and New Haven, as well as in Massachusetts, are owned by commuter agencies. A number of corridor services operate over the route, including *Acela Express, Acela Regional,* and the *Clockers.* In addition, numerous long-distance and commuter trains operate over the route. The characteristics of the route are as follows.

### Table 8. NEC Route Characteristics

| | FY 2001 | FY 1996 |
|---|---|---|
| **Route Miles** | 456 | 456 |
| **Round-Trip Frequency**[37] | 42 | 35 |
| **Corridor Train Ridership**[38] | 10.90 million | 9.23 million |
| **Maximum Speed** | 150 mph | 125 mph |

The corridor does not receive state operating support for intercity service on the corridor since it is part of Amtrak's national system as originally designated. However, the corridor is a recipient of substantial state capital and operating investments as well as federal capital investment.

Since 1992, the eight states with service on the Northeast Corridor have invested approximately $1.8 billion in state and non-Amtrak federal funds for infrastructure improvements that directly or indirectly benefit intercity passenger rail service. During the same period, commuter railroads operating on the Amtrak-owned portion of the corridor have provided over $500 million in operating payments to Amtrak for use of the corridor.[39]

37 Does not include long-distance trains or New York–Harrisburg Keystone trains.

38 Includes ridership on *Acela Regional* trains on New Haven–Springfield–Boston and Washington–Richmond–Hampton Roads segments.

39 The Northeast and Mid-Atlantic States: Major Investors in Intercity Passenger Rail That Serves the Region and the Nation, Preliminary Survey Findings, CONEG Policy Research Center, Inc. April 2002.

Over $4 billion has been invested by the federal government since 1976, including electrification, track realignment and rebuilding, signal upgrades, grade-crossing removal and closure, station improvements, and significant speed increases. New equipment has also been procured, including high-speed *Acela Express* trainsets (operated at up to 150 mph), and high-horsepower locomotives that can operate at speeds up to 135 mph.


**Figure 15. The Northeast Corridor**

States along the corridor have invested large amounts in projects that have both commuter and intercity passenger rail benefits. For example:

- New Jersey has invested more than $1.4 billion to date in the infrastructure. This has included $233 million in improvements to New York and Newark Penn stations, construction of a new station for Newark Airport that is served by both Amtrak and New Jersey Transit, high-density signal upgrades between New York and Newark, the Kearney Connection and Secaucus Transfer allowing commuters on other lines to travel on and connect to the Northeast Corridor, and various joint benefit projects. An additional investment of $175 million in projects of joint benefit is anticipated between 2002 and 2006, under terms of an agreement with Amtrak.

- Delaware has made numerous investments in the Wilmington area, including funding that allowed the construction of Amtrak's Consolidated National Operations Center (CNOC). CNOC is key to Amtrak's operation of all intercity trains. In addition, Delaware has initiated studies that would include creating new commuter service between Dover and Wilmington, creating an additional connection to the Northeast Corridor.

- Connecticut owns 47 miles of the Northeast Corridor, and is currently in the midst of a 10-year, $1.3 billion investment in the line. This investment will be completed by 2006, and is primarily targeted at creating a reliable, first-class commuter rail service. It includes new catenary, as well as improvements in the track, ties, bridges, maintenance and storage facilities, passenger stations, and parking facilities. Connecticut has also made station and parking improvements at stations on the Amtrak-

owned section between New Haven and New London. While primarily focused on commuter operations, many of these investments also benefit intercity rail.[40]

- The Maryland Transit Administration (MTA) has invested over $134 million since 1990 for infrastructure improvements and operating subsidies on the portion of the corridor that supports MARC commuter service. Infrastructure improvements include track, station, and parking improvement projects that serve commuter and intercity passengers. The MTA pays Amtrak for use of the NEC right-of-way and related facilities, and also contracts with Amtrak to provide commuter service on the corridor.[41]

## Context of the Corridor

The Northeast Corridor route is shared with commuter trains operated by MARC (Maryland), SEPTA (Philadelphia), New Jersey Transit, Long Island Rail Road, Metro North Commuter Railroad, Shore Line East, and Massachusetts Bay Transportation Authority. In addition, the infrastructure is shared with freight trains that have trackage rights over the Amtrak-owned track.

With over 30 million metropolitan residents along the Northeast Corridor, it has one of the largest and wealthiest population bases of all corridors. Anchored by Boston, New York, and Washington, DC, the corridor links the nation's political and financial centers and has a higher than average share of business travelers in its ridership. Although the fully implemented Midwest Regional Rail Initiative will connect a larger metropolitan population, the population density of the NEC is high. This population density helps to explain why the NEC accounts for such a large share of Amtrak's corridor ridership. The NEC's population density is over 65,000 residents per route mile.

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40 June 26, 2001 letter from the Commissioner of the Connecticut Department of Transportation to Amtrak Reform Council Chairman Gilbert Carmichael.

41 The Northeast and Mid-Atlantic States: Major Investors in Intercity Passenger Rail That Serves the Region and the Nation, Preliminary Survey Findings, CONEG Policy Research Center, Inc. April 2002.

## Table 9. Population Trends Along the Northeast Corridor

| Area | Census Population | | Change, 1990 to 2000 | |
|---|---|---|---|---|
| | April 1, 2000 | April 1, 1990 | Number | Percent |
| Baltimore, MD PMSA | 2,552,994 | 2,382,172 | 170,822 | 7.2% |
| Boston, MA-NH PMSA | 3,406,829 | 3,227,707 | 179,122 | 5.5% |
| New Haven–Meriden, CT PMSA | 542,149 | 530,180 | 11,969 | 2.3% |
| New London–Norwich, CT–RI MSA | 293,566 | 290,734 | 2,832 | 1.0% |
| Newark, NJ PMSA | 2,032,989 | 1,915,928 | 117,061 | 6.1% |
| New York, NY PMSA | 9,314,235 | 8,546,846 | 767,389 | 9.0% |
| Philadelphia, PA–NJ PMSA | 5,100,931 | 4,922,175 | 178,756 | 3.6% |
| Providence–Fall River–Warwick, RI–MA MSA | 1,188,613 | 1,134,350 | 54,263 | 4.8% |
| Trenton, NJ PMSA | 350,761 | 325,824 | 24,937 | 7.7% |
| Wilmington–Newark, DE–MD PMSA | 586,216 | 513,293 | 72,923 | 14.2% |
| Washington, DC–MD–VA–WV PMSA | 4,923,153 | 4,223,485 | 699,668 | 16.6% |
| **Total** | **30,292,436** | **28,012,694** | **2,279,742** | **8.1%** |

Amtrak's Northeast Corridor Services are competitive with air and auto in many markets throughout the corridor. *Acela Express* services reach average speeds in excess of 84 mph between New York and Washington, DC, with a typical trip time of 2 hours 42 minutes. Despite scheduled air travel of approximately one hour from Reagan National in Washington, DC, to La Guardia in New York, the door-to-door travel time from downtown Washington, DC, to Manhattan is quite similar. As a result, Amtrak's *Metroliner* and *Acela Express* services have a large share of the business traveler market between the two cities. This market share has grown even greater since the events of September 11. Automobile travel between New York and Washington, DC, takes approximately four hours under good driving conditions. The convenience of the automobile in reaching one's final destination, and the relatively high price of train and air tickets, often causes it to be the mode of choice in the leisure market. However, the highways are frequently congested, leading the time-sensitive traveler to use air or rail instead.

Rail has a distinct time advantage over air in the Philadelphia to Washington, DC, or New York markets. Philadelphia to New York is too short to fly (about 90 miles), and the rail service at 1 hour 7 minutes (average speed of 80 mph) is significantly faster and more

dependable than driving. The Philadelphia-to-Washington, DC, market is also infrequently flown, as it is only 135 miles. *Acela Express* trip times of 90 minutes result in an average speed of 90 mph, again much faster than driving, which takes approximately one hour longer.

The New York-to-Boston traveler can travel by rail to Boston South Station in less than 3 hours 30 minutes, at an average speed of 67 mph. This is significantly faster than the 51 mph average speed of trains that preceded *Acela Express*. However, these trip times are not as competitive as the times south of New York. Boston Logan-to-New York La Guardia flights take less than one hour. Even with airport access, downtown-to-downtown travel time by air in less than three hours is possible. Recent security delays have encouraged more business travelers to use rail, but faster trip times would certainly attract additional riders. The automobile is also more competitive with rail in this market, with typical trip times of about four hours.

Beyond the major endpoint markets described above, there are important intermediate markets in this corridor, including Baltimore, MD, Wilmington, DE, Newark, NJ, Stamford, CT, New Haven, CT, and Providence, RI. The strength of the intermediate markets is a distinguishing feature of the NEC.

All the market descriptions above use the fastest rail trip times. *Acela Regional* trains also serve the markets at somewhat slower average speeds, but at lower prices. While not especially attractive to the business traveler, who would otherwise fly, they still are significantly faster than auto between New York and Washington, DC, (average speed of more than 70 mph).

Amtrak's and the states' recent capital investments to the corridor have begun to address the overall capital needs, but significant additional investments are planned and needed. The corridor has needs related to keeping the infrastructure in good condition as well as those needed to serve the growing demand for corridor service. These needs are summarized in the discussion below.

## Description of Corridor Needs

Amtrak is currently in the process of extensive studies to determine its long-term capital needs for the corridor. These studies will address issues including:

- Improvements to the Hudson River tunnels into Manhattan.
- Enhancements to the Baltimore tunnels.
- Post-*Acela* speed and capacity improvements between New York and Boston.
- Additional investments required to respond to the new security environment.

These capital costs are not quantified in the corridor profile at this time. However, Amtrak has developed capital costs related to addressing the backlog of investments needed to maintain the safety and reliability of existing service (commonly called "State of Good Repair" investment), as well as improving the New York–Washington segment of the corridor. State of Good Repair is estimated to cost $3.8 billion, and this report assumes these investments would be made over the next six years. Improvements to the New York–Washington segment of the corridor are estimated to cost $9.3 billion, allowing expanded and faster high-speed service, as well as additional capacity for commuter and freight operations. Spreading these investments over a 20-year time period results in the following summary of the corridor's partial capital needs.

### Table 10. NEC Capital Needs

| Time Period | Max Speed[42] | Capital Cost |
|---|---|---|
| **Current** | 135 mph | – |
| **Near-Term** | 150 mph | $6.59 billion |
| **Vision** | 150 mph | $6.51 billion |

42 Max speed for the Washington–New York segment only. Current maximum speed between New York and Boston is 150 mph.

# Keystone Corridor Profile

The *Keystone* corridor stretches from Philadelphia, PA, in the east to Harrisburg, PA, in the west (see map on the following page). It is a multiple track, electrified railroad that has been operated and owned by Amtrak since 1971. The line roughly parallels the Pennsylvania Turnpike (I-76) and US Route 30 between Harrisburg and Philadelphia. Trip time by automobile or passenger rail is approximately two hours. With current corridor service operating 98 percent on time, rail is highly competitive with automobile even before additional investments are made.

### Table 11. Keystone Route Characteristics

| | FY 2001 | FY 1996 |
|---|---|---|
| **Route Miles** | 104 | 104 |
| **Round-Trip Frequency**[43] | 9 | 5 |
| **Corridor Train Ridership** | 1,033,000 | 520,000 |
| **Maximum Speed** | 110 mph | 90 mph |

The corridor receives significant operating and capital support from the state of Pennsylvania, plus investments from federal, Amtrak and other sources:

- State Operating Support: $4.10 million (FY 2001).
- State Infrastructure Investment: $4 million (through FY 2002).
- Other Infrastructure Investment: $35 million (through FY 2002).

## *Context of the Corridor*

The *Keystone* route is shared with both commuter trains operated by SEPTA and long-distance Amtrak trains that continue west of Harrisburg to Chicago (the *Pennsylvanian* and *Three Rivers*). The route also benefits significantly from many frequencies continuing north of Philadelphia to New York City and south to Washington, DC. In addition, the infrastructure is shared with freight trains that have trackage rights over the Amtrak-owned track.

Running from Philadelphia to Harrisburg with a corridor extension to Pittsburgh, the *Keystone* Corridor connects Pennsylvania's commercial centers on the eastern and western borders of the state, to the state's capitol. Population along this corridor is concentrated

43 Does not include two long-distance trains that also serve the corridor—the Philadelphia-to-Chicago *Pennsylvanian* provides local service between Philadelphia and Harrisburg, while the New York-to-Chicago *Three Rivers* does not accept local passengers. Many corridor trains also servie New York City. Frequencies are for weekday service; fewer trains operate on weekends.

in the endpoints. With population growth of under three percent, the pace of metropolitan expansion along the *Keystone* Corridor is well below the United States pace of 13 percent for the decade.

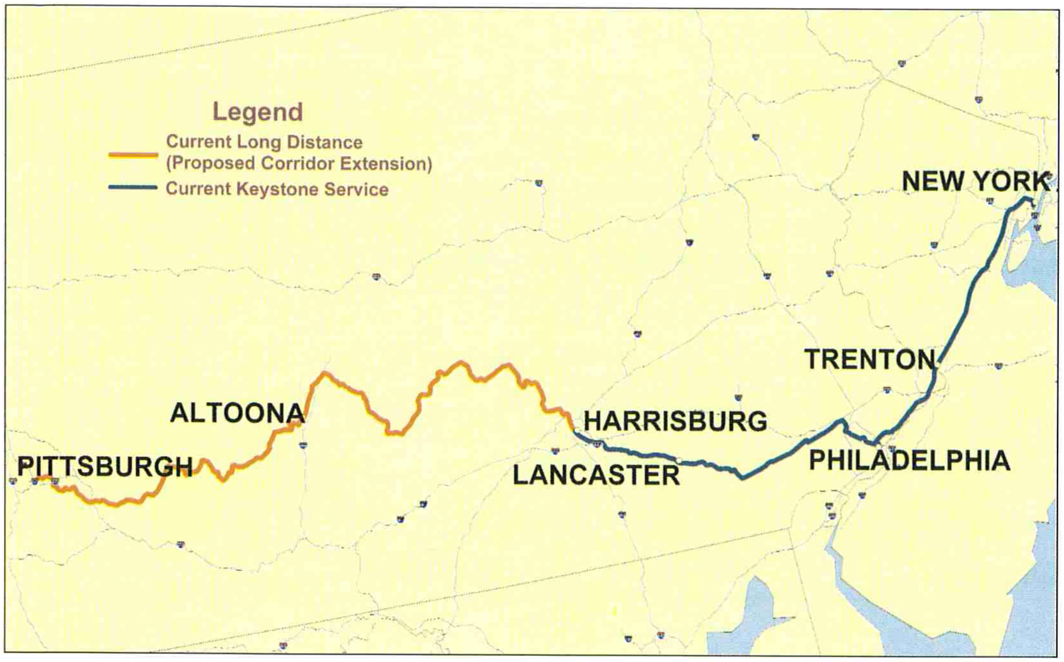


**Figure 16. The *Keystone* Corridor**

### Table 12. Population Trends Along the *Keystone* Corridor

| | Census Population | | Change, 1990 to 2000 | |
|---|---|---|---|---|
| *Area* | *April 1, 2000* | *April 1, 1990* | *Number* | *Percent* |
| Altoona, PA MSA | 129,144 | 130,542 | –1,398 | –1.1% |
| Harrisburg–Lebanon–Carlisle, PA MSA | 629,401 | 587,986 | 41,415 | 7.0% |
| Johnstown, PA MSA | 232,621 | 241,247 | –8,626 | –3.6% |
| Lancaster, PA MSA | 470,658 | 422,822 | 47,836 | 11.3% |
| Philadelphia, PA–NJ PMSA | 5,100,931 | 4,922,175 | 178,756 | 3.6% |
| Pittsburgh, PA MSA | 2,358,695 | 2,394,811 | –36,116 | –1.5% |
| **Total** | **8,921,450** | **8,699,583** | **221,867** | **2.6%** |

### Table 13. Corridor Plans

| Time Period | Max Speed | Frequency | Ridership | Capital Cost |
|---|---|---|---|---|
| **Current** | 110 mph | 9 | 1.03 million | $0.04 billion |
| **Near-Term** | 110 mph | 10 | 1.50 million | $0.17 billion |
| **Vision** | 125 mph | 12 | 2.50-3 million | $0.14 billion |

### Table 14. Capital Needs in the *Keystone* Corridor

| Statistic | Near-Term | Vision |
|---|---|---|
| *Operating* | | |
| Trainsets Required[44] | N/A | N/A |
| Passengers | 1.50 million | 2.50–3 million |
| *Capital Cost* | | |
| Rolling Stock | $0.04 billion | N/A |
| Infrastructure | $0.13 billion | $0.14 billion |

## *Near-Term Improvement Plan*

The near-term improvement plan focuses on infrastructure improvements to allow for speeds up to 110 mph. These improvements include track and tie replacements, communications and signaling upgrades, cantenary and electrification work, and structural repairs. The last three grade crossings on the route would be closed or bridged, and stations would be improved at Harrisburg, Lancaster, and Elizabethtown. A new station would be built at Harrisburg International Airport. Finally, existing Amfleet cars will be refurbished with new amenities, rebuilt AEM7 electric locomotives will replace the diesels currently operating on the route, and new cab cars will be purchased to allow push–pull operation.

Trip times would be reduced on the route, and frequency increased to hourly during peak periods:

- Philadelphia–Harrisburg: 1 hr. 30 min. (25% faster) 10 round trips

44 Route will operate with refurbished Amfleet coaches, rebuilt AEM7 electric locomotives, and newly purchased cab control cars.

## *Vision Improvement Plan*

The vision improvement plan focuses on infrastructure improvements to allow for speeds up to 125 mph. The higher speeds would allow 90-minute trip times to be achieved with a short extension of the route to Center City, beyond the current eastern terminus at 30th Street Station. The equipment would also be enhanced with additional amenities.

Trip times would remain the same, but over a slightly longer route to Center City, and frequency increased:

- Philadelphia–Harrisburg: 1 hr. 30 min. 12 round trips

## *Issues Unique to Corridor*

The long-term vision for the *Keystone* Corridor includes an extension of the corridor west to Pittsburgh. This extension is currently under study, with preliminary results expected in 2002. Amtrak's and Penn DOT cost estimates for the *Keystone* Corridor extension range between $0.5 billion and $1.2 billion.

# Empire *Corridor Profile*

The *Empire* Corridor stretches from New York City in the southeast to the Buffalo/Niagara Falls area in the west (see map on the following page). It utilizes CSX-owned track for most of the corridor, with Metro North Commuter Railroad and Amtrak owning the track south of Poughkeepsie, which is 75 miles north of New York City.[45] Although it was not designated as an official high-speed corridor until 1996 (under TEA-21), there has been 110-mph service between New York City and Albany since 1979. Amtrak has provided service on this route since its beginning, and ridership has grown by more than 33 percent since FY 1996:

### Table 15. *Empire* Route Characteristics

| | FY 2001 | FY 1996 |
|---|---|---|
| **Route Miles** | 460 | 460 |
| **Round-Trip Frequency**[46] | | |
| New York City–Albany | 13 | 8 |
| Albany–Buffalo | 3 | 2.5 |
| **Corridor Train Ridership**[47] | 1,304,000 | 978,000 |
| **Maximum Speed** | 110 mph | 110 mph |

The corridor has received significant capital investment from the state of New York, plus investments of local, federal, Amtrak, freight railroad, and other sources:

- State Infrastructure Investment: $129 million (through FY 2001–2002).
- Other Infrastructure Investment: $185 million (through FY 2001–2002).
- State Equipment Investment: $23 million (through FY 2001–2002).
- Other Equipment Investment: $25 million (through FY 2001–2002).

The infrastructure program is being developed in three stages: Schenectady to Albany, Albany to New York City, and Schenectady west to Buffalo and Niagara Falls.

45 Amtrak owns the West Side Connection, allowing access from the Metro North route into Penn Station.

46 Weekday frequencies. Corridor also served by one daily long-distance train (the *Lake Shore Limited*) that continues beyond Buffalo to Chicago not included in the totals. Two corridor trains that travel north from Albany to serve the Adirondacks, Montreal, and Vermont are included. Corridor trains to Buffalo continue to Niagra Falls, and one round trip per day continues to Toronto.

47 Ridership includes the *Maple Leaf* between Toronto and New York City. The *Lake Shore Limited,* the one long-distance train that continues beyond Buffalo to Chicago, is not included.

Station improvements are also part of New York's passenger rail infrastructure investments. Between 1990 and 2001, a total of $82 million has been invested in stations, plus an additional $40 million for the Penn Station/Farley Post Office redevelopment. These investments have addressed not only the station itself, but also highway access improvements and the track and signal work required at the station site.

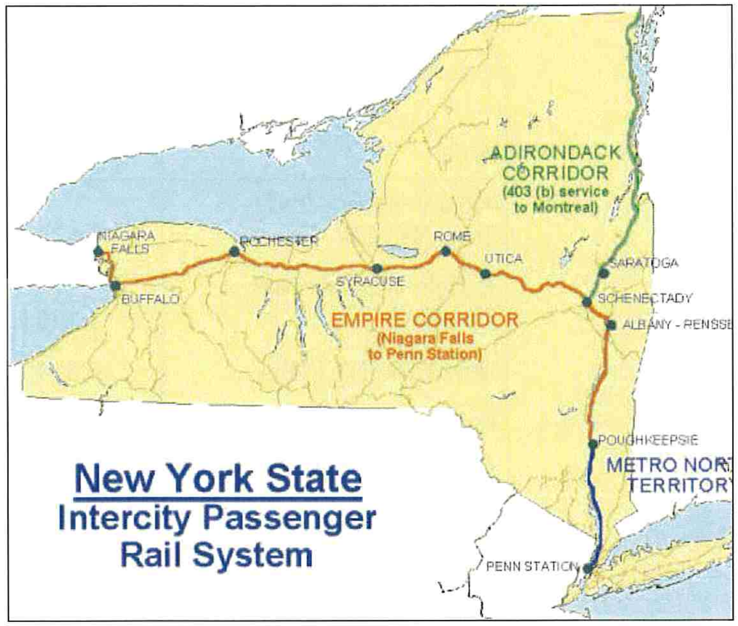


**Figure 17. The Empire Corridor**

The *Empire* Corridor is served by Turboliner trainsets that were originally manufactured in the 1970s. These trainsets are now being improved for use on the corridor. They are gas turbine-powered, with third rail electric capability. The trainsets have five cars consisting of a power unit at each end, two coach cars, and a cafe car. The Federal Railroad Administration and New York state jointly funded the remanufacture of the first two Turboliners. New York state and Amtrak will jointly fund the remaining five. The trainsets will be owned by New York, and operated by Amtrak within the state. The total cost for the seven trainsets will be approximately $93 million, with $48 million spent to date.

## Context of the Corridor

The *Empire* route shares track with Metro North commuter trains in the area near New York City. In addition, the route has significant freight train movements, and is shared by one daily round-trip long-distance train (the *Lake Shore Limited*). New York state developed a passenger rail plan that provided the basis for a Memorandum of Understanding with Amtrak. The first portion is being implemented under the terms of a Program Agreement between New York and Amtrak, and is reflected in the capital numbers provided below.

Metropolitan population trends along the *Empire* Corridor have benefited strongly from the size and health of New York's expansion. New York City accounts for about 70 percent of the corridor's metropolitan population. The corridor also benefits from travel generated by the synergies between the state's commercial and political centers. New York's population gain over the past decade easily offset outright population losses among other corridor economies such as Buffalo, Syracuse, and Utica over the past decade. On average, the corridor's metropolitan population grew by six percent, just under half the U.S. pace over the past decade.

### Table 16. Population Trends Along the *Empire* Corridor

| | Census Population | | Change, 1990 to 2000 | |
|---|---|---|---|---|
| *Area* | *April 1, 2000* | *April 1, 1990* | *Number* | *Percent* |
| Albany–Schenectady–Troy, NY MSA | 875,583 | 861,424 | 14,159 | 1.6% |
| Buffalo–Niagara Falls, NY MSA | 1,170,111 | 1,189,288 | −19,177 | −1.6% |
| New York, NY PMSA | 9,314,235 | 8,546,846 | 767,389 | 9.0% |
| Rochester, NY MSA | 1,098,201 | 1,062,470 | 35,731 | 3.4% |
| Syracuse, NY MSA | 732,117 | 742,177 | −10,060 | −1.4% |
| Utica–Rome, NY MSA | 299,896 | 316,633 | −16,737 | −5.3% |
| **Total** | **13,490,143** | **12,718,838** | **771,305** | **6.1%** |

Current New York–Albany service is fairly competitive with driving, and preferred over air travel. Existing trains average nearly 60 mph, and operate with a high-degree of on-time performance. Current rail travel time is 2 hours, 20 minutes for the 140-mile trip, but that is directly to Penn Station in Manhattan, with direct connections to the subway and commuter rail networks. By auto, either the New York State Thruway or the Taconic State Parkway can get one to NYC in two hours; however, driving into NYC entails congested bridges and tunnels, as well as limited, high-cost parking. When compared to air travel, rail travel between NYC and Albany is still competitive. Approximate flight time between NYC and Albany is one hour (non-jet service); however, security check in, parking, traffic congestion, and travel time from JFK or LaGuardia to Midtown Manhattan could add another two hours to the trip.

Future improvements to the New York to Albany segment will reduce travel times significantly, and increase average speeds to more than 80 mph. This will make rail significantly faster than auto.

From Albany to Buffalo, current scheduled rail travel time is 5 hours, 17 minutes, but this is often subject to delays. Automobile travel via the NYS Thruway can take only 4.5 hours at 65 mph complete with clean, modern rest areas for the 290-mile trip.

The New York–Buffalo market is currently roughly competitive with auto, with a 58 mph average speed. Air travel is significantly faster. Airport-to-airport time is one hour. Even allowing a generous two hours for security, check-in, and baggage, and 1.5 hours for airport access, air travel is nearly three hours faster than rail. Air travel time between NYC and the upstate cities of Syracuse, Rochester, and Buffalo has recently become more competitive with the introduction of low-cost providers such as Jet Blue, which provides frequent daily flights with a one hour, 20-minute travel time to Buffalo.

The improvements envisioned for the corridor will reduce rail travel to a little over five hours, with an average speed exceeding 80 mph. While this will still be slightly longer than air travel, it will be much more competitive with auto travel. In addition, a number of intermediate city pairs on the route, but not analyzed above, provide passengers with trip times faster than both air and rail.

### Table 17. Corridor Plans

| Time Period | Max Speed | Frequency[48] | Ridership | Capital Cost[49] |
|---|---|---|---|---|
| Through 2001 | 79–110 mph | 13–3 | 1.30 million | $0.36 billion |
| Near-Term | 79–125 mph | 14–4 | 2.00 million | $0.34 billion |
| Mid-Term | 90–125 mph | 16–6 | 3.00 million | $0.26 billion |
| Vision | 125 mph | 18–10 | TBD | $1.30 billion |

### Table 18. Capital Needs

| Statistic | Near-Term | Mid-Term | Vision |
|---|---|---|---|
| Operating | | | |
| Trainsets Required[50] | N/A | N/A | Up to 9 additional |
| Passengers | 2.0 million | 3.0 million | TBD |
| Capital Cost | | | |
| Rolling Stock | $0.05 billion | N/A | $0.13 billion |
| Infrastructure | $0.29 billion | $0.26 billion | $1.17 billion |

## *Near-Term Improvement Plan*

The near-term improvement plan focuses on refurbishing equipment and improving track to allow for higher speeds and increased frequencies. In addition to completing the remanufacture of all seven Turboliner trainsets, the maintenance facilities at Rensselaer will be improved and significant track work will be conducted. Double tracking will occur between Schenectady and Albany–Rensselaer, curve straightening and track realignment both south and west of Albany, and safety improvements made to grade crossings and bridges. In certain locations between Albany and New York City, speeds will be upgraded to 125 mph.

48 Frequency by segment: New York–Albany and Albany–Buffalo/Niagara Falls.

49 Excludes station investment at Farley/Penn Station in New York City.

50 Near-term and mid-term assume remanufacture of seven existing Turboliner trainsets. Capital cost included in near term.

Trip time reductions on the route, and frequency increases, would be as follows:

- New York–Albany: 2 hrs. 00 min. (17% faster) 14 round trips
- Albany–Buffalo: 4 hrs. 55 min. (9% faster) 4 round trips

### Mid-Term Improvement Plan

This improvement plan focuses on completing the signal upgrades between Albany and Buffalo that will allow speeds to increase to 90 mph, resulting in trip times up to 11 percent faster than the near-term plan as follows:

- New York–Albany: 2 hrs. 00 min. (0% faster) 16 round trips
- Albany–Buffalo: 4 hrs. 23 min. (11% faster) 6 round trips

### Vision Improvement Plan

The vision improvement plan focuses on upgrades between Albany and Buffalo that will allow speeds to increase to 110–125 mph over at least portions of the route, as well as further improvements along the line between New York and Albany. Additional trainsets will allow for increased frequencies, and trip times up to 20 percent faster than the mid-term plan, as follows:

- New York–Albany: 1 hr. 45 min. (13% faster) 18 round trips
- Albany–Buffalo: 3 hrs. 30 min. (20% faster) 10 round trips

### Issues Unique to Corridor

New York state chose to redirect $100 million of its TEA-21 Congestion Mitigation/Air Quality funding to improve the *Empire* Corridor. Passenger rail is an appropriate use of CMAQ, but it was not an easy fund source to secure, especially for a statewide program that travels through multiple air quality attainment areas. This was the case despite the strong support from New York's Congressional delegation.

In order to use CMAQ, the FHWA required the state to produce a highway Design Report. Further, in addition to the difficulty in programming such a statewide project, MPOs (Metropolitan Planning Organizations) that were CMAQ-eligible needed to pass a resolution of support even if they did not have a specific rail project in their area. The *Empire* Corridor passes through eight of the thirteen MPOs in New York state, and all six of the non-attainment MPOs (including Buffalo, the Capital District, and the downstate/metropolitan New York City MPOs.)

Most MPOs did not have passenger rail specifically in their long-range plans, but they saw the need for passenger rail. The MPOs understood that even without a specific project within their boundary, they could benefit from improved air quality and better overall passenger and freight rail service. While there may not have been a large shift in terms of mode share, moving auto travel to rail has a direct impact on the bridges and tunnels into the New York-metropolitan area.

# Midwest Regional Rail Initiative Corridors

Within the Midwest, three rail corridors are leading the expansion of service in the region; these are Chicago–Milwaukee–Minneapolis, Chicago–St. Louis, and Chicago–Detroit, which are profiled in detail below. With some of the region's largest metro economies serving as endpoints, these corridors are the most traveled rail routes in the central United States.

Beyond these arteries, however, there are numerous rail corridors that link major industrial centers in the region. With Chicago as the hub, Kansas City, Cleveland, Indianapolis, Cincinnati, and Omaha are all key destinations on a growing rail network known as the Midwest Regional Rail Initiative (MWRRI). A state-led effort initiated in 1996, the nine members of the MWRRI have been funding studies and making incremental infrastructure investments in order to introduce high-speed rail and an improved level of service and amenities to the Midwest. The nine state members are: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin.

## *Midwest Regional Rail Initiative*

The proposed Midwest Regional Rail System expands rail service beyond the region's largest metro areas to serve regional centers and smaller urban areas in the Midwest with the result that a transportation system serving a few corridors is transformed into a unified and coordinated system serving the majority of the region's population.

As shown in the map on page 79, the high-speed regional passenger rail system envisioned for the Midwest encompasses some 3,000 miles in nine states. Union Station in Chicago serves as the hub, with spokes radiating outward to Minneapolis–St. Paul, Green Bay, Detroit, Grand Rapids/Holland, Port Huron, Cleveland, Cincinnati, Carbondale, St. Louis, Kansas City, Quincy, and Omaha. The system also provides scheduled service to intermediate centers enroute along these other corridors including Kalamazoo, Toledo, Indianapolis, Springfield, IL, Des Moines, Madison, Lansing, Jefferson City, and Iowa City. Connections to major airports in the region are also under consideration. The MWRRI intends to bring new technology, service levels, and amenities to the Midwest.

With over 35 million residents, the metropolitan population of the fully implemented MWRRI will exceed that of the NEC. Connecting the manufacturing and commercial centers of the Midwest, 12.5 percent of the nation's total population lives in the metropolitan areas that comprise this network. Because of the rural nature of the Midwest region and the large amount of miles, the average population density across the whole system is lower than for selected individual corridors, such as the NEC or the Chicago-Milwaukee corridor. Average population growth in the corridor is below the U.S. average of 13 percent, a reflection of the slower population growth of the Midwest region overall.

## Table 19. Population Trends Across the Full Midwest Regional Rail Initiative System

| Area | Census Population | | Change, 1990 to 2000 | |
|---|---|---|---|---|
| | *April 1, 2000* | *April 1, 1990* | *Number* | *Percent* |
| Ann Arbor, MI PMSA | 578,736 | 490,058 | 88,678 | 18.1% |
| Benton Harbor, MI MSA | 162,453 | 161,378 | 1,075 | 0.7% |
| Bloomington–Normal, IL MSA | 150,433 | 129,180 | 21,253 | 16.5% |
| Champaign–Urbana, IL MSA | 179,669 | 173,025 | 6,644 | 3.8% |
| Chicago, IL PMSA | 8,272,768 | 7,410,858 | 861,910 | 11.6% |
| Cincinnati, OH–KY–IN PMSA | 1,646,395 | 1,526,092 | 120,303 | 7.9% |
| Cleveland–Lorain–Elyria, OH PMSA | 2,250,871 | 2,202,069 | 48,802 | 2.2% |
| Detroit, MI PMSA | 4,441,551 | 4,266,654 | 174,897 | 4.1% |
| Elkhart–Goshen, IN MSA | 182,791 | 156,198 | 26,593 | 17.0% |
| Flint, MI PMSA | 436,141 | 430,459 | 5,682 | 1.3% |
| Gary, IN PMSA | 631,362 | 604,526 | 26,836 | 4.4% |
| Grand Rapids–Muskegon–Holland, MI MSA | 1,088,514 | 937,891 | 150,623 | 16.1% |
| Indianapolis, IN MSA | 1,607,486 | 1,380,491 | 226,995 | 16.4% |
| Jackson, MI MSA | 158,422 | 149,756 | 8,666 | 5.8% |
| Kalamazoo–Battle Creek, MI MSA | 452,851 | 429,453 | 23,398 | 5.4% |
| Kansas City, MO–KS MSA | 1,776,062 | 1,582,875 | 193,187 | 12.2% |
| Kenosha, WI PMSA | 149,577 | 128,181 | 21,396 | 16.7% |
| Lafayette, IN MSA | 182,821 | 161,572 | 21,249 | 13.2% |
| Lansing–East Lansing, MI MSA | 447,728 | 432,674 | 15,054 | 3.5% |
| Milwaukee–Waukesha, WI PMSA | 1,500,741 | 1,432,149 | 68,592 | 4.8% |
| Minneapolis–St. Paul, MN–WI MSA | 2,968,806 | 2,538,834 | 429,972 | 16.9% |
| Omaha, NE–IA MSA | 716,998 | 639,580 | 77,418 | 12.1% |
| Racine, WI PMSA | 188,831 | 175,034 | 13,797 | 7.9% |
| Springfield, IL MSA | 201,437 | 189,550 | 11,887 | 6.3% |
| St. Louis, MO–IL MSA | 2,603,607 | 2,492,525 | 111,082 | 4.5% |
| Toledo, OH MSA | 618,203 | 614,128 | 4,075 | 0.7% |
| **Total of MWRRI MSAs with Rail Service Currently** | **33,595,254** | **30,835,190** | **2,760,064** | **9.0%** |

**Table 19. Population Trends Across the Full Midwest Regional Rail Initiative System *(cont'd)***

| | Census Population | | Change, 1990 to 2000 | |
|---|---|---|---|---|
| *Area* | *April 1, 2000* | *April 1, 1990* | *Number* | *Percent* |
| Davenport–Moline–Rock Island, IA–IL MSA | 359,062 | 350,861 | 8,201 | 2.3% |
| Des Moines, IA MSA | 456,022 | 392,928 | 63,094 | 16.1% |
| Iowa City, IA MSA | 111,006 | 96,119 | 14,887 | 15.5% |
| Green Bay, WI MSA | 226,778 | 194,594 | 32,184 | 16.5% |
| Madison, WI MSA | 426,526 | 367,085 | 59,441 | 16.2% |
| **Total with MSAs Receiving New Rail Service** | **35,174,648** | **32,236,777** | **2,937,871** | **9.1%** |

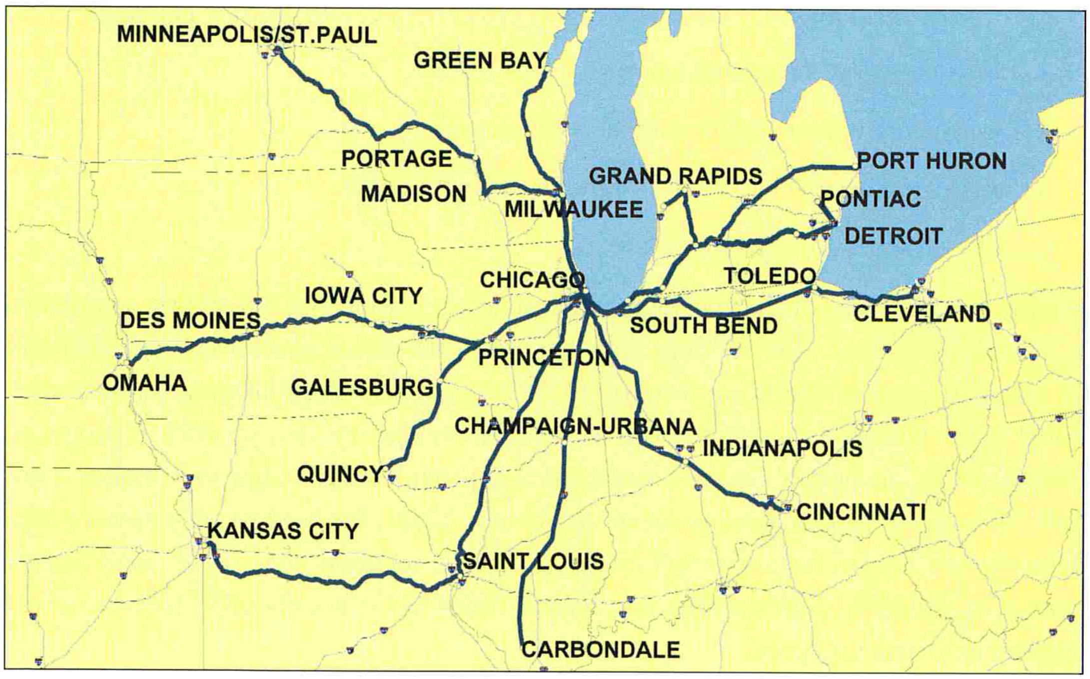


**Figure 18. The Full MWRRI System**

Service attributes of the MWRRI include new rolling stock that operates at significantly faster speeds than existing equipment and provides more on-board amenities designed to meet the needs of business and leisure travelers. A key component of this enhanced service is the use of modern rail equipment. Plans call for the purchase of 66 trainsets. The travel-time savings afforded by these equipment upgrades and associated infrastructure investments will vary by corridor.

Not only will travel times be faster, but also the frequency of trains will increase, providing passengers with greater flexibility in planning their trips. The focus on customer service will be extended to the train stations, as well. Train stations will be renovated to offer

a pleasant travel experience, and passenger information systems, food service, and access to local transportation will be available at all stations. The MWRRI will introduce new technology service levels, and a greater level of customer amenities to the Midwest.

The main system elements and service attributes of the Midwest Regional Rail System are:

### System Elements

- Uses 3,000 miles of existing rail to connect rural, small urban, and large metropolitan areas in the Midwest region,
- Designed as a hub-and-spoke passenger rail system anchored by Chicago, and
- Provision of multi-modal connections to improve system access.

### Service Attributes

- Use of modern equipment with trains operating at speeds up to 110 mph,
- Improved travel times and frequencies,
- Competitive fares that maximize revenue yields,
- Improved accessibility and on-time performance, and
- On-board and station amenities.

Significant capital investment will be required to attain the level of rail service envisioned by MWRRI planners. The funding plan for MWWRI makes several key assumptions. First, it anticipates a significant level of federal participation in financing the necessary capital costs. Federal funds from both transportation and non-transportation programs will contribute. Second, it assumes that states will provide the funding to purchase train-sets and to match federal funding for infrastructure. Third, the funding plan assumes that some private sector financing will be obtained to augment the public investments. Overall, the MWRRI plan assumes that federal funds will cover about 80 percent of the requisite infrastructure costs.

The total estimated cost for infrastructure and equipment for the MWRRI system is $4.8 billion.[51]

MWRRI's implementation will phase in service over a 10-year time horizon. The most traveled routes, such as Chicago–Detroit, Chicago–Milwaukee–Minneapolis, and Chicago–St. Louis are among the first to be upgraded (see detailed corridor profiles in the following sections). Corridors with comparatively lower ridership levels will be implemented later in the 10-year time horizon.

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51 Capital estimates here and in the following MWRRI corridor profiles represent recent information provided by the states and update those published in the February 2000 Executive Summary Report.

# Midwest Regional Rail Initiative Corridors: Chicago–Detroit

### *(with extensions to Pontiac, Grand Rapids, Holland, and Port Huron)*

The Chicago–Detroit Rail Corridor connects downtown Chicago to downtown Detroit using existing rail rights-of-way. Intermediate stops along the corridor include some of the Midwest's small manufacturing and education centers such as Hammond–Whiting, Niles, Kalamazoo, Battle Creek, Jackson, Dowagiac, Albion, Ann Arbor, and Dearborn. The rail line generally parallels Interstate 94. Amtrak has operated rail service between Chicago and Detroit since its creation in 1971. Ridership has declined in recent years.

**Table 20. Chicago–Detroit Corridor Characteristics**

| | FY 2001 | FY 1996 |
|---|---|---|
| **Route Miles** | 302 | 302 |
| **Round-Trip Frequency** | 3[52] | 3 |
| **Corridor Train Ridership** | 295,000 | 375,000 |
| **Maximum Speed** | 79 mph[53] | 79 mph |

While the state of Michigan and others has made capital investments in the route, no operating subsidies have been provided. The state does provide operating subsidies to the *Pere Marquette* and the *International,* however.

- State Capital Investment: $60 million to date
- Other Capital Investment: $37 million to date

## Context of the Corridor

Travel time with the current service is 5 hours, 15 minutes, putting the average speed along the route at just 53 mph, well below the maximum. Travel times in the industrial Midwest are heavily influenced by the density of freight train operations, whose maximum speed is frequently well below 79 mph.

The one exception to the generally slow pace is found in the 45-mile segment of the corridor connecting Kalamazoo and Niles. As of January 2002, the maximum train speed increased to 90 mph. This is the first time in about 20 years that speeds outside of the Northeast have increased above 79 mph.

52 One round trip Chicago–Detroit only.

53 Increased to 90 mph over a 45-mile section in January 2002.

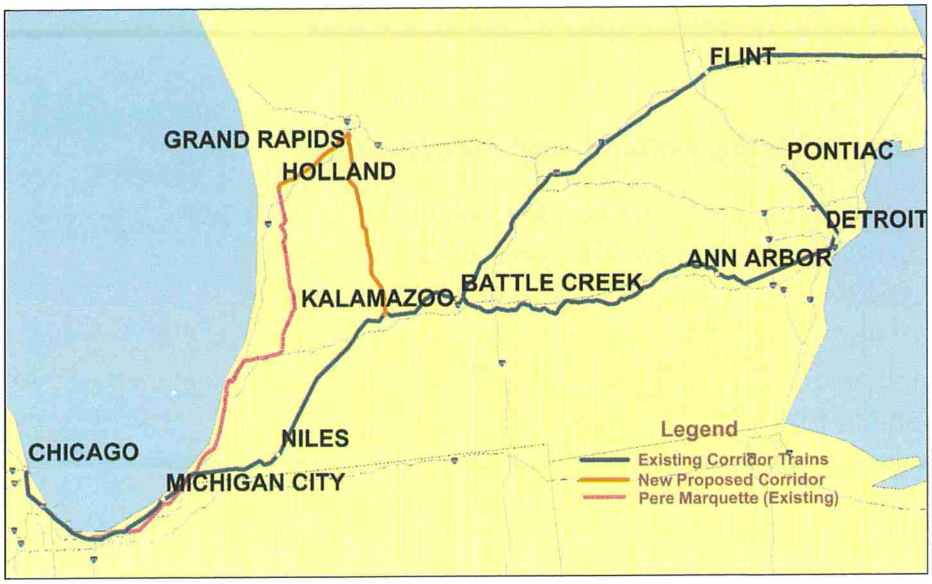


**Figure 19. The Chicago–Detroit Corridor**

The current speed puts passenger rail at a competitive disadvantage relative to other travel modes in the corridor. The distance between Chicago and Detroit can be traveled by car in roughly five hours, with the added route flexibility that a car affords. Travel time by air is roughly 1 hour and 15 minutes, airport to airport. Adding on an additional two hours for parking, security, check-in and baggage, and the three hours and 15 minutes of air travel time remains significantly below the time it would take by rail. Travel between the airports and downtown adds additional time to the total air trip time, but even assuming this is another hour and a half, travel time with the current rail service is still greater.

Containing two of the Midwest's largest metropolitan economies, the population base for this corridor is substantial. Over 15 million people live within the corridor, according to the 2000 Census. The Chicago metropolitan area accounts for over half of the corridor's population. Overall, the population of the Chicago–Detroit corridor expanded by about nine percent, below the U.S. pace of 13 percent but still slightly ahead of the broad Midwest regional economy.

**Table 21. Population Trends Along the Chicago–Detroit Corridor**

| | Census Population | | Change, 1990 to 2000 | |
|---|---|---|---|---|
| *Area* | *April 1, 2000* | *April 1, 1990* | *Number* | *Percent* |
| Ann Arbor, MI PMSA | 578,736 | 490,058 | 88,678 | 18.1% |
| Chicago, IL PMSA | 8,272,768 | 7,410,858 | 861,910 | 11.6% |
| Detroit, MI PMSA | 4,441,551 | 4,266,654 | 174,897 | 4.1% |
| Flint, MI PMSA | 436,141 | 430,459 | 5,682 | 1.3% |
| Grand Rapids–Muskegon–Holland, MI MSA | 1,088,514 | 937,891 | 150,623 | 16.1% |
| Jackson, MI MSA | 158,422 | 149,756 | 8,666 | 5.8% |
| Kalamazoo–Battle Creek, MI MSA | 452,851 | 429,453 | 23,398 | 5.4% |
| Lansing–East Lansing, MI MSA | 447,728 | 432,674 | 15,054 | 3.5% |
| **Total** | **15,297,975** | **14,057,745** | **1,240,230** | **8.8%** |

## Capital Improvement Plan

The Chicago–Detroit rail corridor is a key route of the proposed Midwest Regional Rail Initiative (MWRRI). The MWRRI is a nine-state effort to bring state of the art technology, service, and amenities comparable to those found in the Northeast Corridor to the Midwest. The rail system would be supplemented by a feeder bus system to expand access to the rail network. The scope of the planned investments is so large, that the system will be built and implemented in stages over a 10-year span. The Chicago–Detroit corridor will be among those upgraded in the first phase. The service changes and investments associated with implementation of the MWRRI have the following implications for the Chicago-Detroit corridor.

### Table 22. Corridor Plans

| Time Period | Max Speed | Frequency | Ridership | Capital Cost |
|---|---|---|---|---|
| Current | 79–90 mph | 3 | 0.30 million | $0.10 billion |
| Near-Term | 90–110 mph | 10 | 1.84 million | $0.54 billion |
| Vision | 110 mph | 10 | 2.33 million | N/A |

### Table 23. Corridor Needs

| Statistic | Near-Term | Vision |
|---|---|---|
| *Operating* | | |
| Trainsets Required | 16 new | N/A |
| Passengers | 1.84 million | 2.33 million |
| *Capital Cost* | | |
| Rolling Stock | $0.16 billion | N/A |
| Infrastructure | $0.38 billion | N/A |

## Near-Term Improvement Plan

### Phase 1: Years 1 to 4

- Increase number of daily trips from 3 to 10
- Increase maximum speed to 110 mph
- Decrease train travel time from 5 hrs 46 min to 3 hrs 41 min on Chicago–Detroit corridor. The train would be competitive with air and faster than by car.

### Phase 2: Year 5

- Introduce faster service on the Battle Creek–Port Huron route, which connects with the Chicago–Detroit Corridor.

### Phase 3: Year 6

- Additional infrastructure and equipment improvements on the Chicago–Detroit corridor.
- Upgrade Kalamazoo–Grand Rapids service, which connects with the Chicago–Detroit Corridor.

Over the next six years MDOT estimates that it will spend $377 million for infrastructure and $161 million for rolling stock, if the MWRRI is implemented. This would include improvements for the Chicago–Detroit–Pontiac, Holland–Grand Rapids–Kalamazoo and the Port Huron-Battle Creek segments of the MWRRI.

## *Vision Improvement Plan*

- Closure of between 30–50 percent of current grade crossings across all corridors in the MWRRI system by 2010; currently there are 260 public and 108 private crossings on the Chicago–Detroit route.

# Midwest Regional Rail Initiative Corridors: Chicago–Milwaukee–Minneapolis

### (including service to Madison and Green Bay)

Current service on the Chicago–Milwaukee *Hiawatha* Corridor connects downtown Chicago to downtown Milwaukee using existing rail rights of way. Canadian Pacific Railway heavily uses the corridor for heavy-haul freight service, Metra for commuter service, and Amtrak for corridor and long-distance passenger services. Amtrak provides long-distance service via the *Empire Builder,* connecting to Minneapolis and on to Seattle. The rail line parallels the I-94 highway. Ridership has grown significantly in recent years, as indicated below:

**Table 24. *Hiawatha* Corridor Route Characteristics**

| | FY 2001 | FY 1996 |
|---|---|---|
| **Route Miles** | 86 | 86 |
| **Round-Trip Frequency** | 6 | 6 |
| **Corridor Train Ridership** | 424,000 | 321,000 |
| **Maximum Speed** | 79 mph | 79 mph |

On-time performance on the route is high, reaching 97 percent in FY 2000. Incremental investments and success in maintaining operating performance have allowed for innovations in customer-focused service. For example, in January 2002, the *Hiawatha* service became just one of three corridors to offer the first Internet-enabled trains in the United States. In a partnership with Yahoo! and Compaq Computer Corporation, the six-month program allowed riders to surf the Web free-of-charge via wireless modems.

The states of Wisconsin and Illinois jointly provide operating subsidies to the route, and capital investments have also been provided by Wisconsin and other sources:

- State Operating Support: $4.8 million in FY02
- State Capital Investment: $2 million to date[56]
- Other Capital Investment: $5 million to date

56 Additional funding will be provided out of the Illinois FIRST infrastructure investment initiative, which will provide $150 million for upgrading state-sponsored rail passenger service on three routes in the state, including Chicago to Milwaukee. See additional discussion under Chicago–St. Louis section.

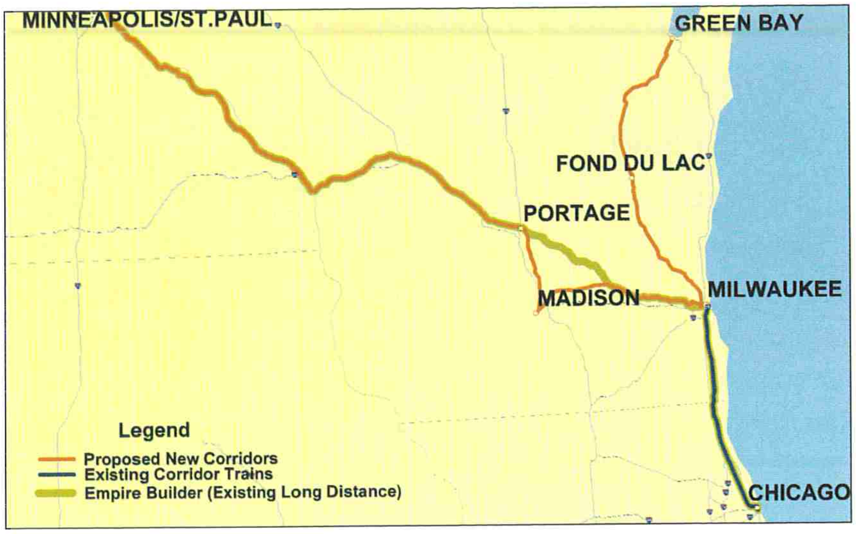


**Figure 20. The Chicago–Milwaukee–Minneapolis Corridor**

## *Context of the Corridor*

Despite the comparatively short length of the rail corridor, the travel time under the current service between Chicago and Milwaukee is 1 hour, 29 minutes. This puts the average speed along the corridor at just under 56 mph, well below the maximum possible. Travel times in the industrial Midwest are heavily influenced by the density of freight train operations, whose maximum speed is frequently well below 79 mph.

The current speed allows the train to compete with air on the route between Chicago and Milwaukee. Flight time, airport to airport, is about 40 minutes. Adding on an additional two hours for parking, security, check-in, and baggage, and the 2 hours and 40 minutes of air travel time exceeds rail travel time, especially for those travelers that have a downtown origin or destination. By comparison, driving time is about 1 hour and 35 minutes under uncongested conditions, about equal to the train. Auto travel times can be substantially greater during peak travel periods. Driving times can vary substantially and unpredictably due to local weather, accident delays or traffic volume.

Connecting the metro areas of Chicago, Milwaukee, Kenosha, and Racine, the Chicago–Milwaukee corridor has a population of over 10.1 million people, as of the 2000 Census. As a consequence, this comparatively short corridor has a high-population density, a factor supporting its success. With over 115,000 people per route mile, the metropolitan density of the Chicago–Milwaukee segment of the corridor exceeds that of the NEC. Chicago dominates the corridor's population, accounting for 80 percent currently, and a still high 60 percent once the extensions to Minneapolis, Green Bay, and Madison are fully implemented.

**Table 25. Population Trends Along the Chicago–Milwaukee–Minneapolis Corridor**

| | Census Population | | Change, 1990 to 2000 | |
|---|---|---|---|---|
| *Area* | *April 1, 2000* | *April 1, 1990* | *Number* | *Percent* |
| Chicago, IL PMSA | 8,272,768 | 7,410,858 | 861,910 | 11.6% |
| Kenosha, WI PMSA | 149,577 | 128,181 | 21,396 | 16.7% |
| Milwaukee–Waukesha, WI PMSA | 1,500,741 | 1,432,149 | 68,592 | 4.8% |
| Racine, WI PMSA | 188,831 | 175,034 | 13,797 | 7.9% |
| **Current Total** | **10,111,917** | **9,146,222** | **965,695** | **10.6%** |
| Green Bay, WI MSA (no rail service currently) | 226,778 | 194,594 | 32,184 | 16.5% |
| Madison, WI MSA (no rail service currently) | 426,526 | 367,085 | 59,441 | 16.2% |
| Minneapolis–St. Paul, MN–WI MSA (has service) | 2,968,806 | 2,538,834 | 429,972 | 16.9% |
| **Total with Extensions** | **13,734,027** | **12,246,735** | **1,487,292** | **12.1%** |

## *Capital Improvement Plan*

The plan is to provide 10 round trips initially and 16 trips ultimately from Chicago to Milwaukee. In addition, the plan provides for six round trips initially and 10 round trips ultimately from Milwaukee to Madison. Further, there will be six round trips from Madison on to Minneapolis and five round trips from Milwaukee to Green Bay. The state of Wisconsin has completed the necessary environmental studies and engineering to extend high-speed rail service from Milwaukee to Madison.

Wisconsin also intends to add a station stop at General Mitchell International Airport. The state has initiated a $100,000 preliminary engineering study for the station and has received $2.5 million in federal and state funding for station construction. For many people living within the corridor, O'Hare in Chicago and Mitchell in Milwaukee are both easily accessible. Given O'Hare's size and congestion problems, many passengers may choose Mitchell for ease of access when sufficient flights at the smaller airport are available.

The service changes and investments associated with implementation of the MWRRI have the following implications for the Chicago–Milwaukee–Minneapolis corridor:

### Table 26. Corridor Plans

| Time Period | Max Speed | Frequency[57] | Ridership | Capital Cost[58] |
|---|---|---|---|---|
| **Current** | 79 mph | 6 (CHI-MIL) | 0.42 million | $0.01 billion |
| **Near-Term** | 110 mph (MIL-MAD-MIN); 79 mph (CHI-MIL) | 10 (CHI-MIL-MAD); 6 (MAD-MIN) | 2.50 million | $0.68 billion[59] |
| **Vision** | 110 mph (CHI-MIL); 79 mph (GB) | 16 (CHI-MIL) and 5 (MIL-GB) | 3.20 million | $0.76 billion |

### Table 27. Corridor Needs

| Statistic | Near-Term | Vision |
|---|---|---|
| *Operating* | | |
| Trainsets Required | 12 new | N/A |
| Passengers | 2.50 million | 3.20 million |
| *Capital Cost* | | |
| Rolling Stock | $0.23 billion | $0.03 billion |
| Infrastructure | $0.45 billion | $0.73 billion |

## *Near-Term Improvement Plan*

- New 110-mph passenger rail service to Madison.
- Increase maximum speed to 110 mph on service to Minneapolis.
- Decrease train travel time from 1 hr 29 min to 1 hrs 5 min on Chicago–Milwaukee corridor.
- Decrease train travel time from Chicago to Twin Cities from 7 hrs 56 min to 5 hrs 42 min.

57 Excludes one daily long-distance train.

58 In 1998 dollars. Expenditure estimates updated from the last MWRRI publications; obtained directly from state planners.

59 Includes corridor expansion to Madison and Minneapolis/St. Paul.

### *Vision Improvement Plan*

- Provide passenger rail service to Green Bay.
- Increase speed from 79 to 110 mph on Chicago–Milwaukee corridor.
- Closure of between 30–50 percent of current grade crossings across the system by 2010 (currently there are 227 public and 119 private crossings on the Chicago–Twin Cities route).[60]
- Continued rail service improvements in connecting corridors within the Midwest.

[60] Midwest Regional Rail Initiative, Strategic Assessment and Business Plan, September 1998, p. 5.5.

# Midwest Regional Rail Initiative Corridors: Chicago-to-St. Louis

The Chicago–St. Louis Rail Corridor connects downtown Chicago with downtown St. Louis using existing rail rights of way. Intermediate stops along the corridor include Joliet, the Bloomington–Normal metro area, home of Illinois State University, Springfield, the state capitol, and Alton, IL. Ridership on the route has not changed substantially in the recent past, and on-time performance was about 55 percent in FY 2000.

**Table 28. Chicago–St. Louis Route Characteristics**

| | FY 2001 | FY 1996 |
|---|---|---|
| **Route Miles** | 281 | 281 |
| **Round-Trip Frequency** | 3 | 3 |
| **Corridor Train Ridership** | 254,000 | 255,000 |
| **Maximum Speed** | 79 mph | 79 mph |

Illinois provides both operating and capital assistance to the Chicago–St. Louis corridor, and other sources have provided capital investment as well:

- State Capital Investment (through FY02): $183 million
- Other Capital Investment (through FY02): $487 million

The state of Illinois has supplemented Amtrak's service with operating support since 1972. The state pays for one additional round trip on the Chicago–St. Louis corridor. State-supported *State House* trains constitute one-third of the frequencies on the Chicago–St. Louis corridor, but account for 43 percent of the ridership.

State support for passenger rail has grown over time, funding a greater share of the operating deficit over the last decade. Annual spending on this and other Illinois-funded corridors has risen from about $2.3 million to about $10.3 million over this time frame.[61]

### Context of the Corridor

Travel time with the current service is 5 hours, 45 minutes, putting the average speed along the route at about 49 mph. The current running time puts passenger rail at a competitive disadvantage relative to other travel modes in the corridor. Under ideal conditions, the distance between Chicago and St. Louis can be traveled by car in roughly five hours, with the added flexibility that a car affords. However, driving times can vary sub-

[61] Also includes fuding for the Chicago-to-Quincy, Illinois *Zephyr,* the Chicago-to-Carbondale *Illini,* and a portion of the Chicago-to-Milwaukee *Hiawathas.*

stantially and unpredictably due to local weather, accident delays or traffic volume. Travel time by air is roughly 1 hour and 15 minutes, airport to airport. Adding on an additional two hours for parking, security, check-in, and baggage, and the 3 hours and 15 minutes of air travel time remains significantly below the time it would take by rail.

Containing both Chicago and St. Louis, two of the Midwest's largest metropolitan economies, the population base for this corridor is substantial but concentrated at the endpoints of the corridor. Over 11 million people live within the corridor, according to the 2000 Census. On average, population growth in this corridor has lagged the national average of 13 percent over the past decade, but has outpaced slightly the broader Midwest regional average.

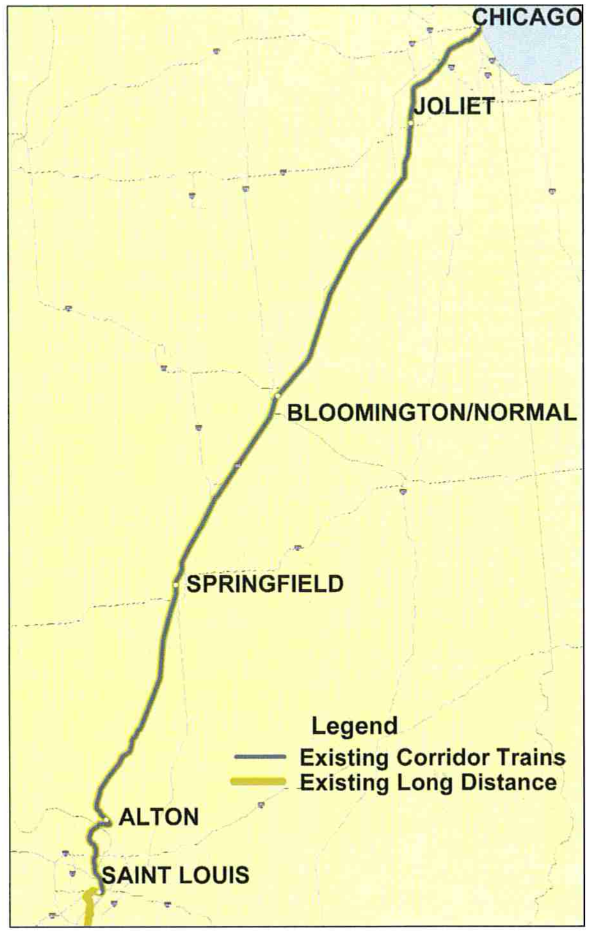


**Figure 21. The Chicago–St. Louis Corridor**

**Table 29. Population Trends Along the Chicago–St. Louis Corridor**

| | **Census Population Population** | | **Change, 1990 to 2000** | |
|---|---|---|---|---|
| *Area* | *April 1, 2000* | *April 1, 1990* | *Number* | *Percent* |
| Chicago, IL PMSA | 8,272,768 | 7,410,858 | 861,910 | 11.6% |
| Bloomingto–Normal, IL MSA | 150,433 | 129,180 | 21,253 | 16.5% |
| Springfield, IL MSA | 201,437 | 189,550 | 11,887 | 6.3% |
| St. Louis, MO–IL MSA | 2,603,607 | 2,492,525 | 111,082 | 4.5% |
| **Total** | **11,228,245** | **10,222,113** | **1,006,132** | **9.0%** |

### Capital Improvement Program

Illinois has a dedicated infrastructure improvement fund (Illinois FIRST). This fund, which is an independent source of funding from other state transportation funds, has allowed the state to significantly increase its support for rail improvements. The fund has earmarked $70 million for improvements in this corridor between FY 2000 and 2004. The fund will also provide $20 million to assist Amtrak in purchasing passenger trainsets with advanced technology for the corridor. Illinois has invested $183 million in capital over the past 10 years.

To date, $70.1 million has been spent on track upgrades, passing sidings, and crossing improvements under contract with the Union Pacific:

- A total of 105,000 ties had been installed by the end of 2001 with fewer than 15,000 remaining to be installed in spring 2002.
- A total of 22 grade crossing upgrades have been installed this year. Public crossings with speeds in excess of 90 mph will receive four quad gates with loop detection devices. By the end of 2002, another 51 public at-grade crossings will be improved.
- All track work between Dwight and Springfield will be completed by the end of 2002 to permit 110-mph service when the positive train control system under development is operational. This will reduce the travel time between Chicago and St. Louis by roughly one hour.

In addition, $4.5 million has been invested to remove a rail bottleneck in the East St. Louis area to reduce train congestion and traffic delays.

The Chicago–St. Louis rail corridor is a cornerstone of the proposed Midwest Regional Rail Initiative (MWRRI). The rail system would be supplemented by a feeder bus system to facilitate public access to the rail network and expand each corridor's market reach beyond the rail line. The scope of the planned investments is so large, that the system will be built and implemented in stages over a 10-year span. The Chicago–St. Louis corridor will be among those upgraded in the first phase. The service changes and investments associated with implementation of the MWRRI have the following implications for the Chicago–St. Louis corridor:

#### Table 30. Corridor Plans

| Time Period | Max Speed | Frequency | Ridership | Capital Cost |
|---|---|---|---|---|
| **Current** | 79 mph | 3 | 0.26 million | $0.67 billion |
| **Near-Term** | 90–110 mph | 8 | 1.38 million | $0.50 billion |
| **Vision** | 110 mph | 8 | 1.50 million | N/A |

**Table 31. Corridor Needs**

| Statistic | Near-Term | Vision |
|---|---|---|
| *Operating* | | |
| Trainsets Required | 6 new | N/A |
| Passengers | 1.38 million | 1.50 million |
| *Capital Cost* | | |
| Rolling Stock | $0.14 billion | N/A |
| Infrastructure | $0.36 billion[62] | N/A |

## *Near-Term Improvement Plan*

### Phase 1: Years 1 to 4

- Increase number of daily trips from 3 to 9 (one long-distance train)
- Increase maximum speed to 110 mph
- Decrease train travel time from 5 hrs 45 min to 3 hrs 42 min. The train would then be competitive with air and faster than car.

### Phase 2: Year 5

- Introduce faster service on branches to the Chicago–St Louis corridor.

Incremental investments to the corridor's infrastructure are permitting high-speed service to be gradually implemented along the Chicago–St. Louis corridor. Illinois FIRST funds, when combined with previous state investments as well as federal and rail industry funds, will permit high-speed rail service on the 120-mile segment of the route between Springfield and Dwight.

The state is working with Amtrak to purchase the necessary trainsets required to operate high-speed rail service between Chicago and St. Louis. Though these new trainsets may not be available for several years, the state and Amtrak are working on a plan to introduce equipment capable of high-speed service on the corridor in the fall of 2002 for use until permanent new trainsets can be acquired. While the exact type of equipment has not yet been decided, the equipment will be used to test the Positive Train Control system, first at 90 mph and then later at 110 mph; the equipment will remain until the new train sets arrive.

Additional investments will focus on the route segments between Springfield and St. Louis, as well as Chicago to Dwight.

62 In 1998 dollars.

The total cost for track improvements, signal and crossing work plus the acquisition of six sets of equipment is estimated at between $500 to $550 million. Of this amount, Illinois FIRST, the Federal Railroad Administration, and the Association of American Railroad have already secured $131 million. The balance of funding has not yet been identified.

Aside from investments made by the state of Illinois, transportation investments are also being made by the state of Missouri in the St. Louis terminal area. As currently planned, the centerpiece of the $40.5 million St. Louis Gateway Transportation Center project will be an intermodal hub offering not only high-speed intercity rail connections, but also bus service, airline ticketing, and direct connections to Lambert–St. Louis International Airport via Metrolink.

### *Vision Improvement Plan*

- Further enhancements to the broader Midwest regional system of which the Chicago–St. Louis corridor is an integral part.

# Extended MWRRI Corridors and Beyond

This profile rounds out the information on Midwestern state rail initiatives presented in the preceding sections. It includes information on the later stages of the formal MWRRI system rollout, as well as other state efforts that are outside of the MWRRI plan. The map below provides a snapshot of the diversity of state rail programs in the region.

## Extended MWRRI Overview

Estimated capital costs for other Chicago Hub Corridors of the MWRRI system and extensions are projected to cost $1,926.4 million for infrastructure and $412.8 million for equipment, bringing the total to $2.339 million. As described in the overview to the Midwest section, MWRRI capital investment will reduce travel times and increase frequencies. In all cases, the travel time savings is greater than one hour. The time savings and frequency increases for those corridors not profiled above are summarized in the tables below.

**Table 32. Expected Improvement in Midwest Travel Times**

| Corridor | Current Service | MWRRI | Reduction in Travel Time |
|---|---|---|---|
| Chicago–Toledo–Cleveland | 6 hrs 32 min | 3 hrs 46 min | 2 hrs 48 min |
| Chicago–Indianapolis–Cincinnati | 8 hrs 48 min | 4 hrs 9 min | 4 hrs 39 min |
| Chicago–Champaign–Carbondale | 5 hrs 34 min | 3 hrs 46 min | 1 hr 18 min |
| St. Louis–Jefferson City–Kansas City | 5 hrs 31 min | 4 hrs 10 min | 1 hr 21 min |
| Chicago–Quincy/ Des Moines–Omaha | 9 hrs 11 min | 7 hrs 11 min | 2 hrs 0 min |

Source: MWRRS Executive Report, February 2000.


**Figure 22. The Diversity of Midwest Rail Initiatives**

**Table 33. Passenger Rail Service Comparison: Daily Roundtrip Frequencies**

| *City Pair* | **Current** *Amtrak Service* | **Fully Implemented** *MWRRI* |
|---|---|---|
| *Chicago–Cleveland* | 3* | 8 |
| Chicago–Toledo | 3* | 8 |
| Toledo–Cleveland | 3* | 9 |
| *Chicago–Cincinnati* | 1* | 6 |
| Chicago–Indianapolis | 2* | 6 |
| Indianapolis–Cincinnati | 1 | 6** |
| *Chicago–Carbondale* | 2* | 2* |
| Chicago–Champaign | 2* | 5* |
| Champaign–Carbondale | 2* | 2* |
| *St. Louis–Kansas City* | 2 | 6 |
| *Chicago–Quincy* | 1 | 4 |
| *Chicago–Omaha* | 1 | 4** |
| Chicago–Princeton | 3* | 9* |
| Chicago–Rock Island | 0 | 5 |
| Rock Island-Iowa City | 0 | 5 |
| Iowa City-Des Moines | 0 | 5 |
| Des Moines-Omaha | 0 | 4 |

Source: MWRRS Executive Report, February 2000

Notes: *Includes Amtrak long-distance trains.

**MWRRI route differs from current Amtrak service.

In anticipation of the MWRRI's eventual implementation and a reflection of their own commitment, a number of states have already begun making investments in passenger rail. Some of these state efforts are outside the MWRRI plan.

### St. Louis–Kansas City

To date, the state of Missouri has invested $31.8 million in infrastructure in the St. Louis–Kansas City corridor. The state anticipates investing another $296.9 million in infrastructure and $47 million in equipment in the next six years. Beyond the next six years, the state has planned improvements requiring another $111.7 million.

The corridor is unique in that one end of the corridor has already had significant station refurbishment and planning is underway for a major upgrade of the station at the other end. Kansas City Union station has already undergone a significant renovation. The St. Louis Gateway Transportation Center, subject to funding availability, will be the centerpiece of the $40.5 million St. Louis Gateway Transportation Center project offering not only high-speed intercity rail connections, but also bus service, airline ticketing and direct connections to Lambert–St. Louis International Airport via Metrolink.

### Indiana's Investment

Four Midwest corridors cross or terminate in Indiana. These are Chicago–Cincinnati, Chicago–Cleveland, Chicago–Detroit (profiled in detail elsewhere) and (Chicago)–Indianapolis–Louisville. Still early in the planning stages, the infrastructure costs for the Indianapolis to Louisville segment are estimated at $150 million with the costs shared by Indiana and Kentucky. Current plans envision five or six daily round trips. Equipment costs for the corridor have not yet been fully specified. The state has initiated several studies to determine the most cost-effective routings for corridors within the state.

To date, Indiana has made improvements on its designated corridors primarily through the provision of funding for various grade crossing projects. A significant project helped the community of Lafayette remove 18 grade crossings on the Chicago-to-Indianapolis, high-speed corridor. The CSX rail line was relocated to a new grade-separated corridor along the Wabash River. A combination of local, state, and federal funding sources were used for this project including over $4 million in state rail assistance funds.

### Ohio's Initiatives

The Ohio Rail Development Commission (ORDC), in partnership with the Ohio Department of Transportation, has actively worked on MWRRI planning and other passenger rail and safety projects. In addition, ORDC and ODOT have recently begun a new initiative to determine the feasibility of developing a separate high-speed rail network that

would connect the MWRRI system to the 3-C corridor in Ohio, the *Keystone* Corridor in Pennsylvania, the *Empire* Corridor in New York and the VIA Rail Corridors in Canada.

Known as the Ohio & Lake Erie Regional Rail–Cleveland Hub network, the system is composed of four corridors serving a travel market population of 22 million. The following cities are served by the potential 860-mile rail network:

- Cleveland–Columbus–Dayton–Cincinnati (3-C corridor)
- Cleveland–Toledo–Detroit
- Cleveland–Pittsburgh, and
- Cleveland–Erie–Buffalo–Niagara Falls–Toronto

Just in the initial stages of planning, no system-wide estimates of potential ridership, capital or operating costs are yet available for the potential Ohio & Lake Erie network. Ohio has, however, detailed high-speed rail planning for the 3-C and Cleveland–Toledo corridors. The new Cleveland Hub study will focus on the synergies created by connecting these, and the other Cleveland Hub corridors, to the established NEC services and the emerging MWRRI system. By itself, the 3-C corridor is projected to have 1.2 million annual riders by 2010. The 3-C capital cost to improve the existing railroads and purchase train-sets is estimated at $711 million. The Cleveland–Toledo–Chicago corridor, which is part of the MWRRS, has an estimated annual ridership of 866,000 and its capital cost is estimated at $724 million. Costs and other details of the potential Cleveland Hub rail network will be available when the study is completed in early 2003.

Conventional passenger rail projects are also under development in Ohio in the following corridors:

- Cleveland–Akron–Canton
- Cincinnati–Dayton
- Columbus–Toledo
- Columbus–Pittsburgh
- Columbus–Chicago

Local rail planners have completed a Major Investment Study of the Canton–Akron–Cleveland corridor for commuter rail and are also studying the Cincinnati–Dayton corridor. The state is also working with Amtrak to evaluate the Toledo–Columbus corridor for start-up service with a mail and express component. Ohio purchased 148 miles of the Columbus–Pittsburgh corridor for $8.6 million.

### Capital Improvements for Safety

The current focus of Ohio's capital investment program is the $200 million Railroad Grade Separation Program and the Corridor Based Grade Crossing Upgrade Program.

### Grade Separation

The 10-year Railroad Grade Separation Program provides funding for 30 grade separation projects in the state. Of these, 18 will be constructed on the passenger rail corridors. The funding breakdown for the state's $200 million Railroad Grade Separation Program is as follows: ODOT, $140 million; ORDC, $20 million; Railroads, $20 million; Local Governments, $10 million; and, Other State Revenues and General Revenue Funds, $10 million.

### Corridor-Based Crossing Improvements

Ohio is focused on crossing warning device upgrades, including new active warning devices and upgraded circuitry where older active warning devices already existed. The state is also working to close crossings on heavily used rail corridors and on Amtrak and federally designated high-speed rail corridors.

**By corridor, the largest on-going capital investments include:**

- Cleveland–Toledo–State Line High–Speed Rail Corridor: Four Grade Separations: $31 million; Crossing Upgrades and Closures: $3.15 million.
- 3-C High–Speed Rail Corridor: 6 Grade Separations: $26.9 million.
- Cincinnati–Chicago (existing Amtrak route) 2 Grade Separations: $26.9 million.
- Cleveland to Pittsburgh (existing Amtrak route) 2 Grade Separations: $15.2 million.
- Cleveland to Buffalo (existing Amtrak route) 3 Grade Separations: $30.4 million.
- Greenwich–Indiana State Line (existing Amtrak route) 1 Grade Separation: $4.5 million; Crossing Upgrades and Closures: $2.5 million.

Total Passenger Safety Improvements are $140 million.

# Southeast High-Speed Rail (SEHSR) Network

The proposed *Southeast High Speed Rail Network* extends from Washington, DC, through Richmond, Raleigh, and Charlotte, to Greenville/Spartanburg to Atlanta and Macon, as well as from Raleigh to Columbia, Savannah, and Jacksonville, FL (see map on the following page). The focus of this profile is the first phase of development, the Washington-Richmond/Hampton Roads–Charlotte route segments. These routes currently have a mixture of short-distance and long-distance trains, and have seen consistent growth in service and patronage since the early 1970s, as illustrated below:

- NC State Operating Support: $5.92 million (FY 2001).
- VA/NC Infrastructure Investment: $111 million (through FY2001–2002).
- Other Infrastructure Investment: $24.8 million (through FY 2001–2002).
- Rolling Stock: NC's *Piedmont* trainset, locomotive purchase, and rehabilitation—$10.1 million.

The route has received significant operating and capital support from the state of North Carolina, and substantial capital investment from the Commonwealth of Virginia. North Carolina purchased the remaining 25 percent of the North Carolina Railroad's stock for $72 million in 1998. Both the *Carolinian* and the *Piedmont* use this line between Raleigh and Charlotte.

### Table 34. SEHSR Network Characteristics

| | FY 2001 | FY 1996 |
|---|---|---|
| *Route Miles* | | |
| Washington–Charlotte | 479 | 479 |
| Richmond–Newport News | 78 | 78 |
| *Round-Trip Frequency*[63] | | |
| Washington–Richmond | 5 + 3LD | 4 + 3 LD |
| Richmond–Newport News | 2 | 1 |
| Richmond–Raleigh[64] | 1 + 1LD | 1 + 1LD |
| Raleigh–Charlotte | 2 | 2 |
| *Corridor Train Ridership* | | |
| Washington–Charlotte | 293,000 | 262,000 |
| All trains serving corridor | 900,000 (est.) | |
| *Maximum Speed* | | |
| Washington–Richmond | 70 mph | 70 mph |
| Richmond–Selma | 79 mph | 79 mph |
| Selma–Raleigh | 59 mph | 49 mph |
| Raleigh–Charlotte | 59–79 mph | 59–79 mph |

63 LD stands for long-distance trains, which supplement corridor trains over certain segments of the corridor.

64 Two additional long-distance trains provide service between Richmond and Selma, NC.

Significant Washington, DC-area commuter service, known as the Virginia Railway Express, operates on the northern end of SEHSR. In many ways, SEHSR is often described as a logical extension of the Northeast Corridor into the fast-growing Southeast. Almost all current services, for example, originate or terminate in the NEC, specifically at New York and Boston. Many SEHSR route segments carry substantial freight tonnage as well.


Figure 23. The SEHSR Network

In North Carolina, NCDOT, in partnership with the North Carolina Railroad (NCRR), has recently embarked on a $25 million modernization and upgrading of its line between Selma, Raleigh, and Charlotte and the state is continuing its extensive station improvement program affecting nearly every station served by Amtrak. In Virginia, major track capacity expansions and line upgrades are underway as are selected bridge replacements. The two states, in cooperation with the Federal Highway Administration and the Federal Railroad Administration, are also in the final phases of Washington–Charlotte SEHSR route selection under the federal EIS process.

A summary of the plan for the corridor is in the table that follows:

**Table 35. Corridor Plans**

| Time Period | Max Speed | Frequency | Ridership | Capital Cost[65] |
|---|---|---|---|---|
| **Current** | 49–79 mph | WAS 5 RVR 2 RGH 2 CLT (2 NPN) | 900,000 | $111 million |
| **Near-Term** | 59–90 mph | WAS 7 RVR 2 RGH 3 CLT (2 NPN) | 1.8 million | $0.48 billion |
| **Vision** | 110 mph | WAS 14 RVR 4 RGH 8 CLT (4 NFK) | 3.6 million | $4.3 billion |

## *Context of SEHSR Development*

In the U.S. Department of Transportation's landmark report, *High-Speed Ground Transportation for America,* SEHSR was given a "specialized analysis" and "afforded exceptional treatment" because of its extraordinary potential for commercial success. According to the report:

- As an extension of the NEC, SEHSR will "generate more revenue than any other" proposed rail corridor in the nation.

65 Excludes capital cost of SEHSR extensions. The proposed extensions are described later in this chapter. As the planning for this part of the SEHSR system is less advanced, capital estimates are more uncertain than those cited above. Preliminary estimates suggest that the extensions would require $0.35 billion to be invested in the next six years and $0.98 billion in the following 7 to 20 years.

- SEHSR has a ratio of public benefits against public costs 27 times larger than any other proposed corridor.
- SEHSR will generate $2.54 in benefits to the nation for every $1 spent to build and operate it.

The Southeast is one of the fastest growing and increasingly urbanized regions of the country. Only the NEC and the total Midwest MWRRI exceed the current population of SEHSR routes, and only the Gulf Coast and South Central rail corridors exceed SEHSR in the 10-year growth rate. For example, Atlanta, GA, and the Raleigh–Durham, NC-metro areas grew 39 percent in this period. All but one metro area in the SEHSR service area had at least a 10 percent growth in the 1990s. Given the educational, tourist, business, and family travel patterns that link the two regions, SEHSR is often viewed as a logical extension of the NEC into the growing Southeast. In fact, 52 percent of potential SEHSR passengers are forecast to begin or end their trips in the NEC. The explosive growth in the Southeast, and increasing concerns about maintaining the quality of life that attracted so many residents to the area, have energized the SEHSR states consider high-speed rail as a viable travel option for their residents.

### Table 36. Population Trends Along the Southeast High-Speed Rail Network

| | Census Population | | Change 1990 to 2000 | |
|---|---|---|---|---|
| *Area* | *April 1, 2000* | *April 1, 1990* | *Number* | *Percent* |
| Atlanta, GA MSA | 4,112,198 | 2,959,950 | 1,152,248 | 38.9% |
| Charlottesville, VA MSA | 159,576 | 131,107 | 28,469 | 21.7% |
| Charlotte–Gastonia–Rock Hill, NC–SC MSA | 1,499,293 | 1,162,093 | 337,200 | 29.0% |
| Columbia, SC MSA | 536,691 | 453,331 | 83,360 | 18.4% |
| Gainesville, FL MSA | 217,955 | 181,596 | 36,359 | 20.0% |
| Greensboro–Winston–Salem–High Point, NC MSA | 1,251,509 | 1,050,304 | 201,205 | 19.2% |
| Greenville–Spartanburg–Anderson, SC MSA | 962,441 | 830,563 | 131,878 | 15.9% |
| Jacksonville, FL MSA | 1,100,491 | 906,727 | 193,764 | 21.4% |
| Lynchburg, VA MSA | 214,911 | 193,928 | 20,983 | 10.8% |
| Norfolk–Virginia Beach–Newport News, VA-NC MSA | 1,569,541 | 1,443,244 | 126,297 | 8.8% |
| Raleigh–Durham–Chapel Hill, NC MSA | 1,187,941 | 855,545 | 332,396 | 38.9% |
| Richmond–Petersburg, VA MSA | 996,512 | 865,640 | 130,872 | 15.1% |
| Savannah, GA MSA | 293,000 | 258,060 | 34,940 | 13.5% |
| Washington, DC–MD–VA–WV PMSA | 4,923,153 | 4,223,485 | 699,668 | 16.6% |
| **Total** | **19,025,212** | **15,515,573** | **3,509,639** | **22.6%** |

**Table 36. Population Trends Along the Southeast High-Speed Rail Network (*cont'd*)**

| | Census Population | | Change 1990 to 2000 | |
|---|---|---|---|---|
| *Area* | *April 1, 2000* | *April 1, 1990* | *Number* | *Percent* |
| Johnson City–Kingsport–Bristol, TN–VA MSA | 480,091 | 436,047 | 44,044 | 10.1% |
| Roanoke, VA MSA | 235,932 | 224,477 | 11,455 | 5.1% |
| Macon, GA MSA | 322,549 | 290,909 | 31,640 | 10.9% |
| **Total with Extensions** | **20,063,784** | **16,467,006** | **3,596,778** | **21.8%** |

Current rail travel times in markets considered for service on the SEHSR are generally slower than auto travel. For example, Charlotte-to-Raleigh service covers 173 miles in 3 hours 43 minutes, at an average speed of 46 mph. Washington to Richmond covers 109 miles in about two hours, at an average speed of 54 mph. These speeds are not truly competitive with auto travel. The longer distances on the route can be covered by air substantially faster than either car or rail (such as Washington to Charlotte).

The corridor improvement plan envisions average speeds that would exceed 80 mph. Such travel times would be highly competitive with auto travel, and would be faster than air in markets under three hours in travel time.

**Table 37. Corridor Needs**

| Statistic | Near-Term | Vision |
|---|---|---|
| <u>*Operating*</u> | | |
| Trainsets Required | 7 | 16 |
| Passengers | 1.8 million | 3.6 million |
| <u>*Capital Cost*</u> | | |
| Rolling Stock | $136.4 million | N/A |
| Infrastructure | $343 million | $4.3 billion |

## *Near-Term Improvement Plan*

The near-term improvement plan focuses on track and signal work to permit increased frequencies and higher speeds:

- Washington–Richmond: 90 mph
- Richmond–Selma: 79 mph

- Selma–Raleigh: 59 mph
- Raleigh–Charlotte: 79 mph

Up to four tilting trainsets are under consideration for near-term purchase to allow the retirement of the Raleigh–Charlotte *Piedmont* HEP trainset, permit a third frequency between these two cities, and possibly re-equip the New York–Charlotte *Carolinian*. Two additional round trips are planned between New York and Richmond.

In addition to funding track and signal improvements and purchasing locomotives and passenger cars, Virginia and North Carolina are making substantial and ongoing improvements to stations in their states, particularly along the SEHSR corridor. In Virginia, the City of Richmond is renovating its downtown Main Street Station, which will see service again in late 2002. In North Carolina, approximately $110 million has been invested so far in such projects as opening a new interim station in Burlington (1999) while redevelopment plans move forward for reuse of the historic Engine House; construction of a shared passenger station/DMV drivers license office in Cary (1996); reconstruction of historic stations in Greensboro (built 1927), and High Point (built 1907) that began in 2001. Plans for a new multi-modal station in uptown Charlotte are well underway, which will accommodate regional and intercity buses as well as rail. The new facility is expected to handle upwards of 500,000 rail passengers annually by 2015.

Trip times would be reduced by up to 25 percent on the route, and frequency increased as follows:

- Washington–Richmond: 1 hr 57 min. (8% faster) 7 round trips
- Richmond–Raleigh: 3 hrs 18 min. (5% faster) 2 round trips
- Raleigh–Charlotte: 2 hrs 50 min. (25% faster) 3 round trips

### Vision Improvement Plan

The vision improvement plan focuses on track and signal improvements that would allow 110-mph speeds over major sections of Washington–Richmond–Charlotte route, as well increase track capacity. This includes reopening the out-of-service CSXT's S Line between Petersburg, VA, and Raleigh, shortening trip times by 95 minutes. Major intermodal facilities would be constructed in Charlotte and Raleigh, and at least two additional frequencies would serve the Northeast-Hampton Roads market. Approximately 16 tilting trainsets would be required to operate Washington–Richmond–Hampton Roads services and SEHSR Charlotte frequencies.

Trip times would be up to 43 percent faster than the near-term plan, as follows:

- Washington–Richmond: 1 hr. 30 min. (23% faster) 14 round trips
- Richmond–Raleigh: 1 hr 53 min. (43% faster) 4 round trips
- Raleigh–Charlotte: 2 hrs 0 min. (30% faster) 8 round trips

## Corridor Initiatives Related to the SEHSR

### *Bristol Service*

Virginia is moving forward with a plan to initiate service from Washington, DC, through Charlottesville, Lynchburg, and Roanoke to Bristol, VA, (374 miles) as well as from Richmond to Bristol (324 miles) with a connection in Lynchburg. This proposed service would tie together important regional centers in central and southwest Virginia, and in the 146 miles from Roanoke to Bristol would parallel the highly truck-congested I-81 corridor.

Current Amtrak service over these Virginia rail routes consists of the New York–New Orleans *Crescent* between Washington, DC, and Lynchburg, VA.

The Virginia General Assembly has appropriated $9.3 million to begin the necessary track and signal work, with another $9.3 million under consideration in this year's session. Total near-term infrastructure improvements, to permit the implementation of two round trips a day at a maximum speed of 79 mph, is $110 million. Three tilting trainsets and locomotives for these frequencies would be needed, costing an additional $75 million.

### *Asheville and Wilmington Service*

North Carolina has begun planning to restore conventional speed passenger service to Asheville and Wilmington, two regional centers currently without passenger rail service. Current planning for Asheville centers on initiating two daily round trips between Asheville and Salisbury with a cross-platform transfer in Salisbury to existing Charlotte–Raleigh services. The Woodside Consulting Group in February 2002, estimated that to establish 3 hour 15 minute travel times between Salisbury and Asheville would require a capital investment of $134 million.

North Carolina DOT, with the assistance of North Carolina State University's Institute for Transportation Research and Education (ITRE), in 2001 evaluated three possible routes to restore rail passenger service to Wilmington. Wilmington–Charlotte, Wilmington–Raleigh via Fayetteville, and Wilmington–Raleigh via Goldsboro were studied with the two Raleigh routes selected for further analysis. A contract has recently been awarded to HDR Engineering to estimate the capital costs of restoring rail service over the Goldsboro line as part of the Wilmington Ports Study.

### *Georgia Rail Programs*

Georgia, which anchors the southern tier of proposed SEHSR routes, is focusing its current passenger rail efforts on planning and implementing four intercity rail corridors: Charlotte–Atlanta; Atlanta–Macon; Macon–Jesup; and Jesup–Jacksonville. These SEHSR

segments are part of a comprehensive $1.9 billion intercity and commuter rail plan approved by the Georgia Transportation Board and the Georgia legislature in 1999.

Near-term investment includes $232.5 million for track and signal modernization, a maintenance facility and stations and parking lots along the 104-mile Norfolk Southern "S" Line between Atlanta and Macon. In addition, $93.3 million in equipment and locomotives will be needed to begin commuter and regional service on this SEHSR route segment. Planned frequencies include two daily round trips between Macon and Atlanta as well as four round trips between Griffin and Atlanta. Trip times with multiple stops would be 2 hours 23 minutes between Macon and Atlanta and 1 hour 45 minutes for trips with only two stops.

An extensive environmental assessment was conducted in 2001, including numerous public meetings and consultations with local governments, which culminated with a Finding of No Significant Impact (FONSI) by the Federal Transit Administration (FTA) in November 2001.

Within three years of the initiation of service to Macon, the state of Georgia plans to extend service beyond Macon to either Jesup and/or Savannah then on to Jacksonville, FL, to complete SEHSR's southeastern route structure. Initially trains would run at a maximum speed of 79 mph with additional infrastructure improvements made within 7 to 20 years to achieve the SEHSR design maximum speeds of 110 mph. The cost of the full infrastructure build out for the 147-mile Macon-to-Jesup route segment is estimated at $119.4 million with an additional $35 million for dedicated high-speed passenger equipment. Similarly, initiating SEHSR service on the 91-mile line south of Jesup to Jacksonville will require $242 million in track and signal modernization and construction.

Extending SEHSR southward from Charlotte through Greenville/Spartanburg to Atlanta is also planned for implementation in the next 7 to 20 years at a cost of $220 million in infrastructure upgrades and right-of-way construction, as well as $70 million in high-speed equipment and locomotives, to achieve 110 mph maximum speeds. This SEHSR line segment is the current routing of Amtrak's New York–New Orleans *Crescent.*

The Multi Modal Passenger Terminal (MMPT) to be built in downtown Atlanta between Spring and Forsyth Streets will be the main Atlanta terminal for intercity and commuter rail services, regional and intercity buses, with a link to MARTA's Five Points station.

Phase 1 of the MMPT will accommodate commuter rail services from Macon and Athens plus regional bus services. This phase is estimated at $50 million, exclusive of land acquisition costs. Subsequent phases will accommodate future regional and intercity bus schedules, five additional commuter rail lines, and Amtrak and SEHSR intercity rail services. These phases are estimated to cost $315 million and envision public/private partnership office development as part of the MMPT build-out.

# Florida Corridor Profiles

The *Florida* corridor system, as mandated in the first stand-alone referendum on high-speed rail placed before the voters in the United States, will connect the state's five largest urban areas, with the first leg from Orlando to Tampa and St. Petersburg, and then to Miami. When fully implemented, future links in the system would serve Southwest, Northeast, and Northwest Florida.

The Florida High-Speed Rail Authority was created by the state to plan for a high-speed rail system in Florida. Currently, the authority is conducting detailed studies and analysis of the Tampa–Orlando corridor segment. The planning and development of this corridor began in late 2001 and will continue through the end of 2006 when construction and testing are scheduled to be completed. The next phases will address the Tampa–St. Petersburg link and the corridor between Orlando and Miami.

### Table 38. Characteristics of Existing Florida Routes

| | Tampa–Orlando | Miami–Orlando |
|---|---|---|
| **Route Miles** | 90 | 353 |
| **Round-Trip Frequency** | None | 2 long-distance |
| **Corridor Train Ridership** | N/A | N/A |
| **Maximum Speed** | 79 mph | 79 mph |

Although there are not any existing corridor train services within Florida, several of Amtrak's long-distance trains operate in the corridor along the parallel CSX railroad.[66] In general, the Florida corridor system links parallel the key intercity highways connecting major urban areas in the state—I-4, I-95, and the Florida Turnpike.

The Florida High-Speed Rail Authority's long-term Vision Plan calls for a statewide high-speed rail system connecting Florida communities across the state. As shown by the map, the proposed system would closely parallel existing highways, beginning first with the Tampa–Orlando corridor. In addition, Amtrak's long-distance train services would be changed, providing direct service from the north between Jacksonville and Miami along the Florida East Coast (FEC) railroad.

## Context of the Corridor

Florida has and continues to experience one of the highest economic growth rates in the United States. The growth shown has and will continue to place increasing pressure on the state's transportation systems to deliver the mobility needed to support economic growth and the personal mobility that Florida's residents and visitors expect.

66 Plans to restructure the service are described on page 110.

Population growth between 1990 and 2000 topped 20 percent in the Florida Corridor with some of the nation's fastest-growing metro areas along its route.

### Table 39. Population Trends Along the Florida Corridor

| | Census Population | | Change, 1990 to 2000 | |
|---|---|---|---|---|
| *Area* | *April 1, 2000* | *April 1, 1990* | *Number* | *Percent* |
| Daytona Beach, FL MSA | 493,175 | 399,413 | 93,762 | 23.5% |
| Fort Lauderdale, FL PMSA | 1,623,018 | 1,255,488 | 367,530 | 29.3% |
| Fort Pierce–Port St. Lucie, FL MSA | 319,426 | 251,071 | 68,355 | 27.2% |
| Jacksonville, FL MSA | 1,100,491 | 906,727 | 193,764 | 21.4% |
| Lakeland-Winter Haven, FL MSA | 483,924 | 405,382 | 78,542 | 19.4% |
| Miami, FL PMSA | 2,253,362 | 1,937,094 | 316,268 | 16.3% |
| Ocala, FL MSA | 258,916 | 194,833 | 64,083 | 32.9% |
| Orlando, FL MSA | 1,644,561 | 1,224,852 | 419,709 | 34.3% |
| Pensacola, FL MSA | 412,153 | 344,406 | 67,747 | 19.7% |
| Tallahassee, FL MSA | 284,539 | 233,598 | 50,941 | 21.8% |
| Tampa–St. Petersburg–Clearwater, FL MSA | 2,395,997 | 2,067,959 | 328,038 | 15.9% |
| West Palm Beach–Boca Raton, FL MSA | 1,131,184 | 863,518 | 267,666 | 31.0% |
| **Current Total** | **12,400,746** | **10,084,341** | **2,316,405** | **23.0%** |
| Fort Myers–Cape Coral, FL MSA (does not have service currently) | 440,888 | 335,113 | 105,775 | 31.6% |
| Gainesville, FL MSA (does not have service currently) | 217,955 | 181,596 | 36,359 | 20.0% |
| Naples, FL MSA (does not have service currently) | 251,377 | 152,099 | 99,278 | 65.3% |
| Sarasota–Bradenton, FL MSA (does not have service currently) | 589,959 | 489,483 | 100,476 | 20.5% |
| **Total with Corridor Extensions** | **13,900,925** | **11,242,632** | **2,658,293** | **23.6%** |

Florida has a strong system of limited access highways connecting its major urban centers and serving most portions of the state. It also has a highly developed system of airports with substantial commercial air service. Further expansion of key elements of the state's limited access highway and airport systems face significant environmental and financial challenges. In this context, it is important for the state to consider additional options for continuing to improve mobility for intercity travelers while supporting the state's economic growth and quality of life objectives.


**Figure 24. The Florida Corridors**

## *Near-Term Improvement Plan*

In the near-term, the Authority is focusing on development of the first leg of the high-speed rail system—Tampa–Orlando. The preliminary evaluation of this corridor, including potential technologies and equipment cost estimates, infrastructure cost estimates, preliminary operating plans, and planning level ridership, and revenue estimates are provided by the Florida High-Speed Rail Authority 2002 Report to the Legislature. These key figures are summarized below.

Equipment technologies considered by the Authority were grouped into the following classes corresponding to operating speed:

- 120–150 mph, conventional diesel-electric/gas-turbine self-propelled technology;
- 180 mph, electrified trainset technology using an overhead catenary system; and
- 250 mph, magnetically levitated (Maglev) technology, propelled along guideways.

Preliminary estimates of capital costs for equipment and infrastructure were prepared for each of these technology classes over a range of route alignments within the corridor and are described below. Note that these preliminary cost estimates are for planning purposes only, and are likely to change as the project proceeds through preliminary engineering.

### Table 40. Capital Costs (millions of 2000 $)

| | Technology (speed) | | |
|---|---|---|---|
| | Non-electric (120–150 mph) | Electrified (180 mph) | Maglev (250 mph) |
| Infrastructure | | | |
| *Tampa–Orlando* | $1,090–$1,300 | $1,470–$1,650 | $5,820–$6,140 |
| *St. Petersburg–Tampa* | $700 | $740 | $1,100 |
| Equipment | $96-$102 | $126 | $105 |
| **Total** | **$1,886–$2,102** | **$2,336–$2,516** | **$7,025–$7,345** |

Preliminary operating plans were prepared for a range of routes and technologies. Cost estimates for the Florida corridors cited elsewhere in this report use the mid-range of the estimates for non-electric technologies. Estimated travel times and frequencies are summarized below.

### Table 41. Service Characteristics

| | Technology (speed) | | |
|---|---|---|---|
| | Non-Electric (120–150 mph) | Electrified (180 mph) | Maglev (250 mph) |
| Travel Times | | | |
| *Tampa–Orlando* | 0:56–1:19 | 0:58–1:09 | 0:55—1:08 |
| *St. Petersburg–Tampa** | 0:09 | N/A | N/A |
| Frequencies | | | |
| *Tampa–Orlando* | 12–14 | 18 | 20 |
| *Orlando Urban Area*** | 6–8 | 8 | 10 |

* St. Petersburg–Tampa tested only at 150-mph

**Orlando Urban Area service between Orlando Airport and Orlando area attractions

Planning level ridership and revenue estimates were also prepared for these proposed new services and are summarized on the following page.

**Table 42. 2010 Ridership and Revenue Estimates for Near-Term Corridor Services**

| Segment/Technology | Daily Round Trips | Annual Ridership (in millions) | Annual Revenue (millions of 2000$) |
|---|---|---|---|
| Tampa–Orlando (120-mph) | 12 | 2.58 | $43.01 |
| Tampa–Orlando (150-mph) | 14 | 2.96 | $60.22 |
| Tampa–Orlando (180-mph) | 18 | 3.17 | $69.19 |
| Tampa–Orlando (250-mph) | 20 | 3.58 | $87.84 |
| St. Petersburg–Tampa (150-mph) | 14 | 3.51 | $71.41 |

In addition to the above high-speed rail corridor development, Amtrak plans to restructure the long-distance passenger rail service to/from Florida. Under this strategy, the *Silver Star, Silver Meteor,* and *Silver Palm* services would be split at Jacksonville. Two trains (the *Meteor* and *Star*) would use the St. Johns River (CSX) route to Orlando and continue on to Tampa, and two trains would use the FEC Railroad along the Florida coast to Miami. One train (*Silver Palm*) would use the Ocala (CSX) route to Tampa, and one train would use the St. Johns River (CSX) route to Orlando and continue on to Miami. The implementation of this program will require two or more years in order to complete certain capital improvements to the Florida East Coast Railroad. It is envisioned that initially only one of the Amtrak *Silver* services (probably the *Star*) would be split at Jacksonville with the eastern segment traversing the FEC.

## *Vision Improvement Plan*

The objectives of the longer-term vision program are to extend high-speed rail service to communities throughout the state. Such a system would closely parallel Florida's interstate highway system and could ultimately connect to a national high-speed rail system. The ultimate capital cost of the vision plan depends on the technology chosen for routes chosen. The numbers presented in this report envision a non-electric system capable of 120 to 150 mph. The Miami-to-Orlando route is estimated to cost an additional $3.5 billion in capital, with a total statewide system preliminarily estimated to cost at least $6 billion over the next 20 years (in addition to the Tampa-to-Orlando investment envisioned in the near-term).

These figures are subject to change based on more refined studies that will be produced by the FHSRA in the future.

# *Systemwide Investment in the California Corridors*

California contains four corridors that are discussed in the subsequent sections. These corridors include three existing corridors (*Capitols, Pacific Surfliner,* and *San Joaquin*) and one emerging corridor (*California Coast*). This section discusses the past statewide investment.

The presentation of financial data in this and subsequent sections is based on California state fiscal year (July-to-June), rather than Amtrak fiscal year (October-to-September). This is also the case for pre-FY92 ridership data. In addition, historical investment in corridors is based on committed capital by funding year. Projects that have been approved for funding, but not yet completed, are included in the historical totals.

The state of California and various other sources (local, federal, Amtrak, freight railroad, and other) have invested significantly in maintenance and layover facilities, as well as rolling stock. Since these assets are frequently shared by more than one corridor and even by long-distance trains, they are presented on a statewide basis. The investments to date are presented below:

- State Maintenance Facility Investments: $61 million (through FY 2001–2002).
- State Rolling Stock Investments: $266 million (through FY 2001–2002).
- Other Maintenance Facility Investments: $60 million (through FY 2001–2002).
- Other Rolling Stock Investments: $305 million (through FY 2001–2002).

These investments include past maintenance facility development and equipment purchases, as well as funding for new equipment such as the *Pacific Surfliner* fleet and new trainsets that have allowed increased frequencies on all corridors in the state. They include the new Oakland and San Diego maintenance facilities currently under development. They also include a route mileage-based proportion of long-distance fleet investments for equipment used on the *Coast Starlight, Sunset Limited, Southwest Chief,* and *California Zephyr* (equipment currently in use represents over $136 million in non-state investment).

Equipment currently in use on corridors is as follows:

### Northern California Equipment Pool

- 78 bi-level passenger cars (66 California Cars, 12 Alstom Cars)
- 17 locomotives (15 EMD F59s, 2 GE Dash 8s)

### *Pacific Surfliner* Fleet

- 50 bi-level passenger cars (Alstom)
- 14 F-59 locomotives

The Northern California equipment is shared between the *San Joaquin* and the *Capitol* corridors. California is the sole owner of the Northern California pool, while Amtrak owns most of the fleet used on the *Pacific Surfliner.*

# Capitol *Corridor Profile*

The *Capitol* Corridor stretches from San Jose, CA, in the south to Auburn, CA, in the east (see map on the following page). It has shown tremendous growth since it began in 1991, as illustrated below:

### Table 43. Characteristics of the *Capitol* Corridor Route

| | FY 2001 | FY 1996 | FY 1992 |
|---|---|---|---|
| **Route Miles** | 169 | 152 | 152 |
| **Round-Trip Frequency** | | | |
| Auburn–Sacramento[67] | 1 | 1 | 1 |
| Sacramento–Oakland | 9 | 4 | 3 |
| Oakland–San Jose | 4[68] | 3 | 3 |
| **Corridor Train Ridership** | 1,073,000 | 457,000 | 226,000 |
| **Maximum Speed** | 79 mph | 79 mph | 79 mph |

The corridor has received significant operating and capital support from the state of California since its beginning in 1991, plus investments of local, federal, Amtrak, freight railroad, and other sources:

- State Operating Support: $16.69 million (FY 2000–2001).
- State Infrastructure Investment: $166 million (through FY 2001–2002).
- Other Infrastructure Investment: $65 million (through FY 2001–2002).
- Recent Trainset Purchase: 12 cars and 4 locomotives for pooled *San Joaquin/Capitol* corridor service (78 cars and 17 locomotives total).
- Additional statewide maintenance, layover facility, and rolling stock investments (see introduction to section).

The *Capitol* route is shared in part with many additional intercity corridor and long-distance trains (the *San Joaquin* corridor, *Coast Starlight,* and *California Zephyr*). The route also benefits significantly from a feeder bus network, which 29 percent of passengers utilize on one or both ends of their train ride (see maps on the following page). In addition, the infrastructure is shared with many freight trains.

The corridor has benefited from extensive, recent planning. Amtrak's vision for the corridor is presented in the California Passenger Rail System: 20-Year Improvement Plan. The plan was sponsored by Amtrak with the cooperation of more than 14 partners from government, transit, and freight railroad organizations. The state's vision is presented in the California State Rail Plan 2001/02–2010/11.

67 FY92 and FY96 frequencies are Roseville to Sacramento only.

68 Six roundtrips on weekends.


**Figure 25. The *Capitol* Corridor**

## Context of the Corridor

The *Capitol* Corridor market is primarily a long-distance business travel market, and air service is not a serious consideration for most travelers. The Sacramento to Emeryville (near Oakland) rail service has typical trip time of 1 hour 48 minutes, at an average speed of 46 mph. While this is not especially fast during non-rush hour periods, the service is still very competitive with auto during rush hours. Rail frequencies have increased significantly in recent years, providing rail travelers with many more choices. The Oakland to San Jose situation is similar-trip time of 1 hour 3 minutes, at an average speed of 43 mph. Again, the business traveler is the primary customer attracted to the rail service, as highways are very congested during rush hour travel periods.

Future speed increases in the Sacramento-to-Oakland area market will make rail much more competitive. Travel times of 80 minutes are envisioned, bringing average speeds to better than 60 mph.

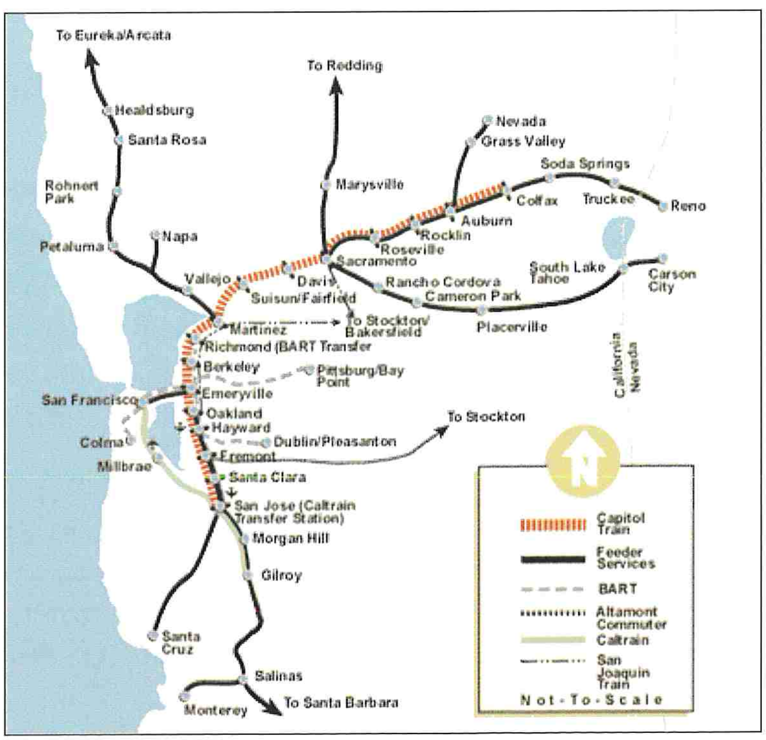


**Figure 26. Detail of the Route**

Average population growth along the corridor is just slightly higher than the national average. By far, the most rapidly growing market has been Sacramento.

### Table 44. Population Trends Along the *Capitol* Corridor

| | Census Population | | Change, 1990 to 2000 | |
|---|---|---|---|---|
| *Area* | *April 1, 2000* | *April 1, 1990* | *Number* | *Percent* |
| Oakland, CA PMSA | 2,392,557 | 2,082,914 | 309,643 | 14.9% |
| Sacramento, CA PMSA | 1,628,197 | 1,340,010 | 288,187 | 21.5% |
| San Jose, CA PMSA | 1,682,585 | 1,497,577 | 185,008 | 12.4% |
| **Total** | **5,703,339** | **4,920,501** | **782,838** | **15.9%** |
| Reno, NV MSA | 339,486 | 254,667 | 84,819 | 33.3% |
| San Francisco, CA PMSA | 1,731,183 | 1,603,678 | 127,505 | 8.0% |
| Vallejo–Fairfield–Napa, CA PMSA | 518,821 | 451,186 | 67,635 | 15.0% |
| **Total with Bus and Rail Extensions** | **8,292,829** | **7,230,032** | **1,062,797** | **12.8%** |

### Table 45. Corridor Plans

| Time Period | Max Speed | Frequency | Ridership | Capital Cost |
|---|---|---|---|---|
| **2001** | 79 mph | 1-9-4/6[69] | 1.07 million | $0.23 billion[70] |
| **Near-Term** | 79 mph | 2/8-12-10[71] | 1.50 million | $0.38 billion |
| **Vision** | 110 mph | 2/4/10-16-16[72] | 3.10 million | $1.03 billion |

69 Frequency by segment: Auburn–Sacramento, Sacramento–Oakland, and Oakland–San Jose.

70 Total investment through California state FY 2001–2002. Excludes additional investments in rolling stock and maintenance facilities. Includes $61 million of funding towards near-term improvement. One already purchased trainset has reduced the near-term capital cost by an additional $15 million.

71 Frequency by segment: Auburn/Roseville–Sacramento, Sacramento–Oakland, and Oakland–San Jose.

72 Frequency by segment: Reno/Auburn/Roseville–Sacramento, Sacramento–Oakland, and Oakland–San Jose.

**Table 46. Corridor Needs**

| Statistic | Near-Term | Vision |
|---|---|---|
| *Operating* | | |
| Trainsets Required | 2 additional | 3 additional |
| Passengers | 1.50 million | 3.10 million |
| *Capital Cost* | | |
| Rolling Stock | $0.03 billion | $0.05 billion |
| Infrastructure | $0.35 billion | $0.98 billion |

## Near-Term Improvement Plan

Amtrak's near-term improvement plan focuses on adding track capacity to allow for additional intercity passenger and freight frequencies. This includes double tracking selected existing single-track sections, adding third and fourth track where needed, realigning curves to allow higher speeds, and replacing or improving stations. In addition, signal systems would be upgraded throughout the route, and one additional trainset would be purchased. More frequent service would be developed on the Roseville-to-Sacramento segment of the corridor (eight round trips per day).

Trip times would be reduced by up to 25 percent on the route, and frequency increased, as follows:

- Auburn–Sacramento: 0 hrs. 50 min. (25% faster) 2–8 round trips
- Sacramento–Oakland: 1 hr. 38 min. (17% faster) 12 round trips
- Oakland–San Jose: 0 hrs. 58 min. (8% faster) 10 round trips

## Vision Improvement Plan

Amtrak's vision improvement plan focuses on track improvements that will allow segments of high-speed running, as well as capacity for additional frequencies. This includes developing a dedicated passenger rail corridor between Oakland and San Jose, a six-mile tunnel bypass near Martinez, a bypass at Niles Junction to reduce curvature, and bridge replacement over the Sacramento River and Suisun Bay. In addition, signal upgrades would allow for nearly 50 miles of 110 mph running, and three additional trainsets would be acquired. Two daily round trips to Reno are included under this plan as well, extending the corridor by 116 miles.

Trip times would be reduced by up to 18 percent faster than the near-term plan, as follows:

- Auburn–Sacramento: 0 hrs. 50 min. (0% faster) 4–10 round trips
- Sacramento–Oakland: 1 hrs. 20 min. (18% faster) 16 round trips
- Oakland–San Jose: 0 hrs. 58 min. (0% faster) 16 round trips

## Issues Unique to Corridor

A significant amount of the corridor infrastructure is shared between the *Capitol* corridor and the *San Joaquin* corridor. This is primarily the stations and infrastructure between Oakland and Martinez, a 32-mile section of route. The division of capital investments between the two corridors follows the future assumptions put forward in the 20-year plan and historical data from the *California Intercity Rail Capital Program.*

Caltrans has planned on spending an additional $52 million on track, signals, and rolling stock to allow the extension of service to Reno. This capital investment is not included in the totals above, and would be carried out over the next 10 years

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# Pacific Surfliner *Corridor Profile*

The *Pacific Surfliner* Corridor stretches from San Luis Obispo on the Central California Coast to San Diego in the south (see map on the following page). It has shown tremendous growth since the 1970s.

### Table 47. Characteristics of the *Pacific Surfliner* Corridor

| | FY 2001 | FY 1996 | FY 1973–1974 |
|---|---|---|---|
| **Route Miles** | 350 | 350 | 128 |
| **Round-Trip Frequency** | | | |
| Los Angeles–San Diego | 11[73] | 8 | 3 |
| LA–Santa Barbara (SB) | 4 | 4 | 0 |
| SB–San Luis Obispo | 1 | 1 | 0 |
| **Corridor Train Ridership** | 1,716,000 | 1,566,000 | 382,000 |
| **Maximum Speed** | 90 mph | 90 mph | 90 mph |

The corridor has received significant operating and capital support from the state of California since 1976, plus investments of local, federal, Amtrak, freight railroad, and other sources:

- State Operating Support: $21.91 million (FY 2000–2001).
- State Infrastructure Investment: $730 million (through FY 2001–2002).
- Other Infrastructure Investment: $316 million (through FY 2001–2002).
- Recent Trainset Purchase: eight Amtrak, two Caltrans (10 total).
- Additional statewide maintenance, layover facility, and rolling stock investments (see introduction to section).

## *Context of the Corridor*

The *Pacific Surfliner* shares much of its route with Los Angeles- and San Diego-area commuter services that were introduced in the 1990s (Metrolink and Coaster) and with the *Coast Starlight* between Los Angeles and San Luis Obispo. In addition, the infrastructure is shared with many freight trains.

The *Pacific Surfliner* market is primarily an auto and rail market, and air service is not a serious consideration for most travelers. Air service is available between Los Angeles and San Diego, with travel times of well under an hour. However, airport access can take quite a long time and much of the passenger base is scattered across an area that is frequently

73 Twelve roundtrips on Friday to Sunday.

quite distant from the airport. The Los Angeles to San Diego average travel time is approximately 2 hours 50 minutes, and average speed over the 128 miles of only 45 mph. While this is not especially fast during non-rush hour periods, the service is still competitive with auto during busy travel periods. Similar average speeds are available north of Los Angeles and between intermediate cities throughout the route. The automobile is still a dominant form of travel with the present rail service, but rail provides a significant mobility option.

Future speed increases in the Los Angeles to San Diego market will make rail much more competitive. Travel times of less than 2 hours minutes are envisioned, bringing average speeds to better than 65 mph.

Anchored by the Los Angeles metropolitan area, over 16 million people live in the metropolitan areas along this rail corridor. Los Angeles accounts for over half of this base. Average population growth in this heavily urbanized corridor lagged the national average in the past decade.


**Figure 27. The *Pacific Surfliner* Corridor**

**Table 48. Population Trends Along the *Pacific Surfliner* Corridor**

| | **Census Population** | | **Change, 1990 to 2000** | |
|---|---|---|---|---|
| *Area* | *April 1, 2000* | *April 1, 1990* | *Number* | *Percent* |
| Los Angeles–Long Beach, CA PMSA | 9,519,338 | 8,863,164 | 656,174 | 7.4% |
| Orange County, CA PMSA | 2,846,289 | 2,410,556 | 435,733 | 18.1% |
| San Luis Obispo–Atascadero–Paso Robles, CA MSA | 246,681 | 217,162 | 29,519 | 13.6% |
| Santa Barbara–Santa Maria–Lompoc, CA MSA | 399,347 | 369,608 | 29,739 | 8.0% |
| San Diego, CA MSA | 2,813,833 | 2,498,016 | 315,817 | 12.6% |
| Ventura, CA PMSA | 753,197 | 669,016 | 84,181 | 12.6% |
| **Total** | **16,578,685** | **15,027,522** | **1,551,163** | **10.3%** |

Amtrak's vision for the corridor is presented in the California Passenger Rail System: 20-Year Improvement Plan. Sponsored by Amtrak. The plan was drafted with the cooperation of more than 14 partners from government, transit, and freight railroad organizations. The corridor has benefited from extensive, recent planning.

### Table 49. Corridor Plans

| Time Period | Max Speed | Frequency | Ridership | Capital Cost |
|---|---|---|---|---|
| **Current** | 90 mph | 11–12 | 1.66 million | $1.05 billion[74] |
| **Near-Term** | 110 mph | 14 | 3.34 million | $1.49 billion |
| **Vision** | 110 mph | 16 | 5.76 million | $2.56 billion |

### Table 50. Corridor Needs

| Statistic | Near-Term | Vision |
|---|---|---|
| *Operating* | | |
| Trainsets Required | No additional | No additional |
| Passengers | 3.34 million | 5.76 million |
| *Capital Cost* | | |
| Rolling Stock | N/A | N/A |
| Infrastructure | $1.49 billion | $2.56 billion |

## *Near-Term Improvement Plan*

Amtrak's near-term improvement plan focuses on adding track capacity to allow for additional intercity passenger, commuter and freight frequency. This includes double tracking many existing single-track sections, plus adding third and fourth tracks as needed. In addition, signal systems would be upgraded throughout the route, allowing increased speeds of up to 110 mph where appropriate.

Trip times would be up to 10 percent faster than the near-term plan, as follows:

- LA–San Diego: 2 hrs. 10 min. (20% faster) 14 round trips
- LA–Santa Barbara: 2 hrs. 7 min. (23% faster) 5 round trips
- SB–San Luis Obispo: 2 hrs. 12 min. (32% faster) 2 round trips

74 Total investment through California state FY 2001–2002. Excludes additional investments in rolling stock and maintenance facilities. Includes $0.20 billion of funding towards near-term improvement. Two already-purchased trainsets have reduced the near-term capital cost by an additional $30 million.

## *Vision Improvement Plan*

Amtrak's vision improvement plan focuses on track improvements that will allow increased speeds over longer sections of the route, as well as capacity for additional frequencies. This includes completing double tracking on the entire route, significant curve and track realignments, and new tunnels at Del Mar and Miramar. No additional trainsets would be required.

Trip times would be up to 13 percent faster than the near-term plan, as follows:

| | | |
|---|---|---|
| • LA–San Diego: | 1 hr. 57 min. (10% faster) | 16 round trips |
| • LA–Santa Barbara: | 2 hrs. 4 min. (2% faster) | 7 round trips |
| • SB–San Luis Obispo: | 2 hrs. 11 min. (1% faster) | 3 round trips |

## *Issues Unique to Corridor*

The investments outlined above also serve to benefit the commuter railroads operating over the same route. In addition, the route stands to benefit significantly from the increased commuter traffic that will result from Metrolink's planned $1.13 billion capital investment. As Metrolink service grows, the *Pacific Surfliner* route can benefit from increased connectivity. Finally, $200 million of investment in track, signals, and stations is expected over the next 10 years to add service to Las Vegas and the Palm Springs area. One round trip per day is envisioned to Las Vegas, and two round trips to Palm Springs. These services would connect with the *Pacific Surfliner* route in Los Angeles.

# San Joaquin *Corridor Profile*

The *San Joaquin* corridor stretches from Bakersfield, CA, in the south to Sacramento, CA, and Oakland, CA, in the north (see map on the following page). It has shown tremendous growth since it began in 1974, as illustrated below:

### Table 51. Characteristics of the *San Joaquin* Corridor

| | FY 2001 | FY 1996 | FY 1974–1975 |
|---|---|---|---|
| Route Miles | 363 | 315 | 315 |
| Round-Trip Frequency | | | |
| *Bakersfield–Oakland* | 4 | 4 | 1 |
| *Bakersfield–Sacramento* | 1[75] | 0 | 0 |
| Corridor Train Ridership | 712,000 | 567,000 | 67,000 |
| Maximum Speed | 79 mph | 79 mph | 79 mph |

The corridor has received significant operating and capital support from the state of California since 1979, plus investments of local, federal, Amtrak, freight railroad, and other sources:

- State Operating Support: $24.35 million (FY 2000–2001).
- State Infrastructure Investment: $342 million (through FY 2001–2002).
- Other Infrastructure Investment: $110 million (through FY 2001–2002).
- Recent Trainset Purchase: 12 cars and four locomotives for pooled *San Joaquin/Capitol* corridor service (78 cars and 17 locomotives total).
- Additional statewide maintenance, layover facility, and rolling stock investments (see introduction to section on California corridors).

## *Context of the Corridor*

The *San Joaquin* route is shared in part with many additional intercity corridor and long-distance trains (the *Capitol* corridor, *Coast Starlight*, and *California Zephyr*). The route also benefits significantly from a feeder bus network, which 67 percent of passengers utilize on one or both ends of their train ride. In addition, the infrastructure is shared with many freight trains.

The *San Joaquin* market is primarily an auto and rail market, but air service is available in certain markets. Rail service takes more than six hours to travel between Oakland and Bakersfield, at an average speed of about 50 mph, over a route that is much more cir-

75 A second train began operation on March 18, 2002.

cuitous than driving. Sacramento-to-Bakersfield service is more direct, but the average speed is still a relatively slow 51 mph. Most travelers do not terminate their journey in Bakersfield, but rather continue by bus for the 100 miles to Los Angeles or other Southern California cities. Air service between Northern and Southern California is relatively fast and frequent. Flying times are typically about one and a half hours, compared to more than eight by rail. Even with airport access and check-in times included, the time-sensitive traveler would rarely choose auto or rail for the entire route.


**Figure 28. The *San Joaquin* Corridor**

Not to be overlooked, however, is the service to and between intermediate cities in the San Joaquin Valley. In-valley markets, such as Bakersfield-to-Fresno or Fresno-to-Stockton, see somewhat faster average speeds of 55–60 mph. While auto speeds are generally somewhat faster, rail provides mobility options in an area that is affected in winter by heavy fog that makes driving difficult.

Future speed increases in the San Joaquin Valley will make rail much more competitive. Travel times of less than five hours between Oakland and Bakersfield, and about four hours between Sacramento and Bakersfield, are envisioned, bringing average speeds to better than 65–70 mph. In-valley speeds will increase to even greater average speeds, making rail more competitive with the automobile. However, in the Northern to Southern California market, air will still have the competitive advantage for the time-sensitive traveler.

Nearly seven million people live in the metropolitan areas along the *San Joaquin* Corridor. Feeder bus extensions more than double this population base. Further supporting ridership in the corridor, is the strong population growth in this region of California. Population growth averaged nearly 19 percent over the decade ending in 2000, well above the national pace of 13.2 percent.

### Table 52. Population Trends Along the *San Joaquin* Corridor

| | Census Population | | Change, 1990 to 2000 | |
|---|---|---|---|---|
| *Area* | *April 1, 2000* | *April 1, 1990* | *Number* | *Percent* |
| Bakersfield, CA MSA | 661,645 | 543,477 | 118,168 | 21.7% |
| Fresno, CA MSA | 922,516 | 755,580 | 166,936 | 22.1% |
| Merced, CA MSA | 210,554 | 178,403 | 32,151 | 18.0% |
| Modesto, CA MSA | 446,997 | 370,522 | 76,475 | 20.6% |
| Oakland, CA PMSA | 2,392,557 | 2,082,914 | 309,643 | 14.9% |
| Sacramento, CA PMSA | 1,628,197 | 1,340,010 | 288,187 | 21.5% |
| Stockton–Lodi, CA MSA | 563,598 | 480,628 | 82,970 | 17.3% |
| **Total** | **6,826,064** | **5,751,534** | **1,074,530** | **18.7%** |
| Los Angeles–Long Beach, CA PMSA | 9,519,338 | 8,863,164 | 656,174 | 7.4% |
| San Francisco, CA PMSA | 1,731,183 | 1,603,678 | 127,505 | 8.0% |
| **Total with Bus Extensions** | **18,076,585** | **16,218,376** | **1,858,209** | **11.5%** |

As with other corridors in the state, the *San Joaquin* corridor has benefited from extensive, recent planning. The vision for the corridor is presented in the California Passenger Rail System: 20-Year Improvement Plan. The plan was sponsored by Amtrak with the cooperation of more than 14 partners from government, transit, and freight railroad organizations.

### Table 53. Corridor Plans

| Time Period | Max Speed | Frequency[76] | Ridership | Capital Cost |
|---|---|---|---|---|
| **Current** | 79 mph | 4–1 | 0.77 million | $0.45 billion[77] |
| **Near-Term** | 90 mph | 5–3 | 1.30 million | $0.82 billion |
| **Vision** | 110 mph | 6–4 | 2.76 million | $0.95 billion |

76 Frequency by segment: Bakersfield–Oakland, Bakersfield–Sacramento.

77 Total investment through California state FY 2001–2002. Excludes additional investments in rolling stock and maintenance facilities. Includes $103 million of funding towards near-term improvement. One already-purchased trainset ahs reduced the near-term capital cost by an additional $15 million.

**Table 54. Corridor Needs**

| Statistic | Near-Term | Vision |
|---|---|---|
| *Operating* | | |
| Trainsets Required | 3 additional | |
| Passengers | 1.30 million | 2.76 million |
| *Capital Cost* | | |
| Rolling Stock | $0.03 billion | N/A |
| Infrastructure | $0.79 billion | $0.95 billion |

## Near-Term Improvement Plan

The strategy for improving service in this corridor is similar to the others in that it concentrates on both capacity and speed increases. Amtrak's near-term improvement plan focuses on adding track capacity to allow for additional intercity passenger and freight frequency, as well as speed increases. This includes double tracking selected existing single-track sections, extending sidings, and realigning curves to allow higher speeds. In addition, signal systems would be upgraded throughout the route, allowing increased speeds of up to 90 mph where appropriate. Finally, two additional trainsets would be purchased (one has already been purchased by Caltrans) to allow for increased frequency of service. Funding is also provided to allow for San Jose to Bakersfield demonstration service.

Trip times would be reduced by up to 14 percent on the route, and frequency increased, as follows:

- Bakersfield–Oakland: 5 hrs. 35 min. (9% faster) 5 round trips
- Bakersfield–Sacramento: 4 hrs. 40 min. (14% faster) 3 round trips

## Vision Improvement Plan

Amtrak's vision improvement plan focuses on track improvements that will allow long stretches of high-speed running, as well as capacity for additional frequencies. This includes significant additional double tracking, siding extensions, and curve realignments. In addition, nearly 90 miles of 110-mph track would be constructed, dedicated for intercity passenger trains. No additional trainsets would be required.

Trip times would be up to seven percent faster than the near-term plan, as follows:

- Bakersfield–Oakland: 4 hrs. 55 min. (13% faster) 6 round trips
- Bakersfield–Sacramento: 4 hrs. 5 min. (12% faster) 4 round trips

## *General Issues and Issues Unique to Corridor*

A significant amount of the corridor infrastructure is shared between the *Capitol* corridor and the *San Joaquin* corridor. This is primarily the stations and infrastructure between Oakland and Martinez, a 32-mile section of route. The division of capital investments between the two corridors follows the future assumptions put forward in the 20-year plan and historical data from the *California Intercity Rail Capital Program.*

The San Jose demonstration service provides benefit to both the *San Joaquin* corridor and the commuter service over a portion of the same route (ACE). Caltrans has also planned to spend $21 million for service extension to Redding, north of Sacramento over the next 10 years.

# California Coast *Corridor Profile*

The *California Coast* Corridor stretches from San Francisco in the north to Los Angeles in the South. Branch service to Monterey from the San Francisco Bay Area is included in the corridor definition (see map on the following page). While train service exists on the entire route, there is no through-intercity passenger train service. However, one long-distance train (the *Coast Starlight*) traverses most of the route, and the northern and southern portions of the route carry existing commuter and corridor services (Caltrain, *Pacific Surfliner*, and Metrolink).

Through the FY 2001–2002 funding year, capital investments have been made in stations and right-of-way acquisition:

- State Infrastructure Investment: $19 million (through FY 2001–2002).
- Other Infrastructure Investment: $4 million (through FY 2001–2002).

## Context of the Corridor

The infrastructure is shared with many freight trains. The corridor has benefited from extensive, recent planning. Amtrak's vision for the corridor is presented in the California Passenger Rail System: 20-Year Improvement Plan. The plan was sponsored by Amtrak with the cooperation of more than 14 partners from government, transit, and freight railroad organizations.

The existing California Coast market is primarily an auto and air market. Only one long-distance train serves the majority of the route. Los Angeles to Oakland is traversed in approximately 11.5 hours, at an average speed of 41 mph. Faster rail-bus service is provided through the *San Joaquin* Corridor, as noted in the profile above. Auto travel is much faster than rail if one takes the inland routes, but this bypasses much of the scenic route along the California Coast. Air service has typical flight times of less than 90 minutes. Even with airport access and check-in, it is by far the fastest mode.

Speed increases for the future San Francisco to Los Angeles service will lead to 8 hour 11 minute trip times, with average speeds of close to 60 mph. This will make the service more competitive in the intermediate auto-dominated markets. However, in the Northern to Southern California market, air will still have the competitive advantage for the time-sensitive traveler, and auto travel down I-5 (or the faster *San Joaquin* service with connecting bus) will still be faster.

Anchored by the Los Angeles- and Bay Area-metropolitan areas, over 16 million people live in the metropolitan areas along the California Coast Corridor. Particularly high housing costs, even in the context of California costs, and growth restrictions in selected areas constrain population growth in the corridor to a greater degree than in other California corridors.


**Figure 29. The California Coast Corridor**

**Table 55. Population Trends Along the California Coast Corridor**

| | **Census Population** | | **Change, 1990 to 2000** | |
|---|---|---|---|---|
| *Area* | *April 1, 2000* | *April 1, 1990* | *Number* | *Percent* |
| Los Angeles–Long Beach, CA PMSA | 9,519,338 | 8,863,164 | 656,174 | 7.4% |
| Oakland, CA PMSA | 2,392,557 | 2,082,914 | 309,643 | 14.9% |
| Salinas, CA MSA | 401,762 | 355,660 | 46,102 | 13.0% |
| San Francisco, CA PMSA | 1,731,183 | 1,603,678 | 127,505 | 8.0% |
| San Jose, CA PMSA | 1,682,585 | 1,497,577 | 185,008 | 12.4% |
| San Luis Obispo–Atascadero–Paso Robles, CA MSA | 246,681 | 217,162 | 29,519 | 13.6% |
| Santa Barbara–Santa Maria–Lompoc, CA MSA | 399,347 | 369,608 | 29,739 | 8.0% |
| **Total** | **16,373,453** | **14,989,763** | **1,383,690** | **9.2%** |

### Table 56. Corridor Plans

| Time Period | Max Speed | Frequency[78] | Ridership[79] | Capital Cost |
|---|---|---|---|---|
| **Current** | 79 mph | 0 | N/A | $0.02 billion[80] |
| **Near-Term** | 90 mph | 1 | 0.20 million | $0.59 billion |
| **Vision** | 125 mph | 2 | 0.42 million | $0.32 billion |

### Table 57. Corridor Needs

| Statistic | Near-Term | Vision |
|---|---|---|
| *Operating* | | |
| Trainsets Required | 4[81] | |
| Passengers | 0.20 million | 0.42 million |
| *Capital Cost* | | |
| Rolling Stock | $0.06 billion | n/a |
| Infrastructure | $0.53 billion | $0.32 billion |

## *Near-Term Improvement Plan*

Additional track capacity to allow for additional intercity passenger, commuter, and freight frequency is a focus of Amtrak's near-term improvement plan. This includes double tracking single-track sections, curve realignments to allow higher speeds, signal upgrades, and third and fourth tracks in areas shared with Caltrain. In addition, signal systems would be upgraded throughout the route, allowing increased speeds of up to 90 mph where appropriate. Finally, two trainsets would be purchased for *Coast* Corridor service, as well as two trainsets for Monterey service.

Trip times would be reduced on the route compared with trip times achievable today:

- LA–San Francisco: 8 hrs. 48 min. (20% faster) 1 round trip

78 Additional service to Monterey and Salinas not included. Two round trips to Monterey and two round trips to Salinas envisioned in plan and included in capital cost.

79 Ridership excludes Monterey and Salinas service.

80 Total investment through California state FY 2001–2002. Includes investments in Monterey service, totaling $17 million towards near term plan.

81 Includes two trainsets for Monterey Service.

### *Vision Improvement Plan*

Amtrak's vision improvement plan focuses on track improvements that will allow increased speeds over longer sections of the route, focusing on major curve and track realignments, siding improvements and speed increases up to 125 mph where appropriate. No additional trainsets would be required.

Trip times would be reduced by an additional seven percent on the route:

- LA–San Francisco: 8 hrs. 11 min (7% faster) 2 round trips

### *Issues Unique to Corridor*

The section of the route between Gilroy (south of San Jose) and San Francisco would be shared with Caltrain commuter service. In addition to the investments included above in the Gilroy to San Francisco segment, Caltrain has planned $420 million in additional near-term capital investments, as well as electrification.

# Pacific Northwest *Corridor*

The *Pacific Northwest* Corridor stretches from Eugene, OR, in the south to Vancouver, BC, in the north (see map on the following page). It has shown tremendous growth since the beginning of corridor expansion in 1993.

### Table 58. Characteristics of the Pacific Northwest Corridor

| | FY 2001 | FY 1996 | FY 1992 |
|---|---|---|---|
| Route Miles | 466 | 466 | 186 |
| Round-Trip Frequency[82] | | | |
| *Seattle–Vancouver* | 2[83] | 1 | 0 |
| *Seattle–Portland* | 3 | 2 | 1 |
| *Portland–Eugene* | 2 | 1 | 0 |
| Corridor Train Ridership[84] | 564,000 | 304,000 | 92,000 |
| Maximum Speed | 79 mph | 79 mph | 79 mph |

The corridor has received significant operating and capital support from the states of Oregon and Washington since 1993, plus investments of local, federal, Amtrak, freight railroad, and other sources:

- State Operating Support: $16.3 million (FY 2001).
- State Capital Investment: $125 million (through FY 2001–2002).
- Other Capital Investment: $355 million (through FY2001–2002).
- Recent Trainset Purchase: two by WA, two by Amtrak.

## *Context of the Corridor*

The Pacific Northwest Corridor is divided into three primary markets—Vancouver, BC, to Seattle, Portland to Seattle, and Portland to Eugene. All are primarily surface transportation markets, although frequent air travel exists between Seattle and Portland.

Seattle to Vancouver trains take just under four hours for the 156-mile run, slowed in part by the border crossing. The average speed of less than 40 mph is generally not competitive with auto (usually less than three hours) or air (a short flight, plus access time to and from the airport).

82 Seattle–Eugene segment also served by *Coast Starlight* long-distance service.

83 Second round trip Seattle to Bellingham only (northernmost stop in Washington state).

84 Excludes *Coast Starlight* local ridership.


**Figure 30. The Pacific Northwest Corridor**

Portland to Seattle trains take 3.5 hours for the 186-mile route, with an average speed 53 mph. Auto travel typically takes less than three hours, and air travel is less than an hour flight, plus access time to and from the airport. With check-in, access and security factored in, air travelers need to plan on basically the same three-hour travel time as auto, and as a result, auto travel is the dominant mode of transportation.

Portland-to-Eugene trains take 2 hours 35 minutes for 124 miles, an average speed of 48 mph. Auto travel is generally less than two hours, and air travel is not a frequently used option.

The speed increases associated with corridor improvement plans would markedly change the competitiveness of rail. The Portland-to-Seattle route would be served in 2.5 hours, at an average speed of 74 mph. This is highly competitive with both auto and air. Seattle-to-Vancouver travel time would be reduced to less than three hours. The average speed of 53 mph is closer to that which is needed to compete with auto travel. The Portland-to-Eugene segment would be reduced to two hours, or an average speed of 62 mph. This is comparable to auto trip times.

With average population growth of nearly 22 percent, the Pacific Northwest Corridor is one of the most rapidly growing corridors in the nation. As a point of contrast, the U.S. population grew by just 13.2 percent over the same time period.

### Table 59. Population Trends Along the Pacific Northwest Corridor (U.S. portion)

| | **Census Population** | | **Change, 1990 to 2000** | |
|---|---|---|---|---|
| *Area* | *April 1, 2000* | *April 1, 1990* | *Number* | *Percent* |
| Bellingham, WA MSA | 166,814 | 127,780 | 39,034 | 30.5% |
| Eugene–Springfield, OR MSA | 322,959 | 282,912 | 40,047 | 14.2% |
| Olympia, WA PMSA | 207,355 | 161,238 | 46,117 | 28.6% |
| Portland–Vancouver, OR –WA PMSA | 1,918,009 | 1,515,452 | 402,557 | 26.6% |
| Salem, OR PMSA | 347,214 | 278,024 | 69,190 | 24.9% |
| Seattle–Bellevue–Everett, WA PMSA | 2,414,616 | 2,033,156 | 381,460 | 18.8% |
| Tacoma, WA PMSA | 700,820 | 586,203 | 114,617 | 19.6% |
| **Total** | **6,077,787** | **4,984,765** | **1,093,022** | **21.9%** |

The route is shared with commuter service in the Seattle area (*Sounder*, from Tacoma to Seattle), and freight trains throughout the route. The route also benefits significantly from a feeder bus network. The corridor has been the focus of recent planning, presented in Washington and Oregon's plans for the Pacific Northwest Corridor (updated in 2000).

### Table 60. Corridor Plans

| Time Period | Max Speed | Frequency[85] | Ridership | Capital Cost |
|---|---|---|---|---|
| **Current** | 79 mph | 2[86]-3-2 | 0.56 million | $0.48 billion |
| **Near-Term** | 79 mph | 2-8-4 | 1.39 million | $0.62 billion |
| **Vision** | 110 mph | 4-13-8 | 2.62 million | $2.07 billion+[87] |

### Table 61. Corridor Needs

| Statistic | Near-Term | Vision |
|---|---|---|
| *Operating* | | |
| Trainsets Required | 6 additional | 12 additional |
| Passengers | 1.39 million | 2.62 million |
| *Capital Cost* | | |
| Rolling Stock | $0.10 billion | $0.18 billion |
| Infrastructure | $0.52 billion | $1.89 billion |

## *Near-Term Improvement Plan*

The near-term improvement plan focuses on adding track capacity to allow for additional intercity passenger and freight frequency, as well as speed increases. Washington improvements would include upgrades to the track through Vancouver Yard (in southern Washington), 17 miles of third main line from Kelso to Martin Bluff, siding extensions at Centralia and Bellingham (both in Washington), and a new 10-mile single-track bypass line to avoid congested and curvy track around Port Defiance (near Tacoma). Oregon projects would focus on improving grade crossings, track, and signal conditions that restrict speeds in urbanized areas, siding extensions, bridge repairs on the Willamette River Bridge, and track extensions. Canada would complete $20 million in work to allow the second Seattle–Vancouver round trip to be extended north of its current terminus in Bellingham. Finally, six additional trainsets would be purchased to allow for increased frequency of service.

85 Segments are as follows: Vancouver–Seattle, Seattle–Portland, and Portland–Eugene.

86 Second train Seattle to Bellingham only.

87 Exlcudes Canadian investment for two additional trains to Vancouver—see discussion at end of profile in section on issues unique to corridor.

Trip times would be reduced by up to 13 percent on the route and frequency increased, as follows:

- Vancouver–Seattle: 3 hrs. 40 min. (6% faster) 2 round trips
- Seattle–Portland: 3 hrs. 15 min. (7% faster) 8 round trips
- Portland–Eugene: 2 hrs. 15 min. (13% faster) 5 round trips

### *Vision Improvement Plan*

The vision improvement plan focuses on track improvements that will allow long stretches of high-speed running, as well as capacity for additional frequencies. This includes significant additional double tracking, siding extensions, and curve realignments. In the case of the Portland-to-Eugene section, double tracking would include linking together existing sidings that are frequently 10 or more miles apart. The Canadian line segment capital costs have not yet been quantified (see discussion below). Speeds of up to 110 mph would be achieved where appropriate, primarily in areas where a third main line is added. Twelve additional trainsets would be required.

Trip times would be up to 24 percent faster than on the near-term plan, as follows:

- Vancouver–Seattle: 2 hrs. 57 min. (20% faster) 4 round trips
- Seattle–Portland: 2 hrs. 30 min. (24% faster) 13 round trips
- Portland–Eugene: 2 hrs. 00 min. (11% faster) 8 round trips

### *Issues Unique to Corridor*

Significant investment is required to serve Vancouver, BC, with more than two roundtrip daily frequencies. The exact capital program has not been developed, but could be as high as $700 million if a new bridge is required over the Fraser River. Less expensive alternatives are possible, and under discussion with the host railroads.

Canadian service also has unique issues related to the border crossing. Corridor service plans assume pre-screening for both immigration and customs will take place in Vancouver. The September 11 terrorist attacks have caused the pre-screening for customs to be suspended, requiring a 20-minute stop at the border. Resolution of this situation is assumed in the trip time and ridership figures above.

In addition, in the Central Puget Sound Area (Everett–Seattle–Tacoma), Pacific Northwest corridor investments and improvements are being coordinated with Sound Transit, the commuter rail agency that uses the same infrastructure.

# Gulf Coast *Corridor*

The *Gulf Coast* Corridor will connect major cities and regional centers from Atlanta, GA, and Pensacola, FL, through Birmingham and Mobile, AL, Biloxi/Gulfport, and Meridian, MS, to New Orleans and Baton Rouge, LA, en route to Beaumont/Port Arthur and Houston, TX. The Gulf Coast Corridor parallels I-10 from Pensacola, FL, to Houston, TX, I-20 from Atlanta, GA, to Meridian, MS, and I-59 from Meridian, MS, to Slidell, LA.

Current Amtrak service over the Gulf Coast Corridor includes the Orlando, FL–Los Angeles *Sunset Limited* from Pensacola, FL, to Houston, TX, and the New York–New Orleans *Crescent* from Atlanta to New Orleans. The Gulf Coast Corridor connects with the Southeast High-Speed Rail (SEHSR) network in Atlanta.

### *2002 Specifics*

- Route Miles
  - Atlanta to New Orleans: 518
  - Pensacola to Houston: 611
- Round-Trip Frequencies
  - Atlanta to New Orleans: one long-distance
  - Pensacola to Houston: one triweekly long-distance
- Maximum Speed
  - Pensacola to Flomaton, AL: 59 mph
  - Flomaton, AL to Houston, TX: 79 mph

The Southern Rapid Rail Transit Commission (SRRTC) oversees and coordinates planning for the Gulf Coast Corridor and is composed of representatives from the states of Louisiana, Mississippi, Alabama, and Florida with informational contacts in Texas. The SRRTC and Amtrak have funded a current study to identify specific short-term and long-term improvements that would be required to implement expanded and time competitive rail service over the Gulf Coast Corridor routes. Initial service over the Pensacola leg of the Gulf Coast Corridor may originate in Mobile, AL, with an eventual goal of extending this leg to Jacksonville, FL.

### *Context of the Corridor*

The Gulf Coast Corridor is fortunate in that the three cities that anchor its route endpoints had a population growth in the 1990s far greater than the national average of 13.2 percent. Atlanta grew 38.9 percent, Pensacola grew 19.7 percent, and Houston grew 25.2 percent. Houston and Atlanta in particular are the economic engines of the Sun Belt cities, with significant business travel between them. New Orleans, which only grew 4.1 percent in the decade, nonetheless remains a very strong tourist and cultural destination, attracting thousands of visitors each year from other Gulf Coast Corridor cities.


**Figure 31. The Gulf Coast Corridor**

## Table 62. Population Trends Along the Gulf Coast Corridor

| | Census Population | | Change, 1990 to 2000 | |
|---|---|---|---|---|
| *Area* | *April 1, 2000* | *April 1, 1990* | *Number* | *Percent* |
| Atlanta, GA MSA | 4,112,198 | 2,959,950 | 1,152,248 | 38.9% |
| Beaumont–Port Arthur, TX MSA | 385,090 | 361,226 | 23,864 | 6.6% |
| Biloxi–Gulfport–Pascagoula, MS MSA | 363,988 | 312,368 | 51,620 | 16.5% |
| Birmingham, AL MSA | 921,106 | 840,140 | 80,966 | 9.6% |
| Hattiesburg, MS MSA | 111,674 | 98,738 | 12,936 | 13.1% |
| Houston, TX PMSA | 4,177,646 | 3,322,025 | 855,621 | 25.8% |
| Lafayette, LA MSA | 385,647 | 344,953 | 40,694 | 11.8% |
| Lake Charles, LA MSA | 183,577 | 168,134 | 15,443 | 9.2% |
| Mobile, AL MSA | 540,258 | 476,923 | 63,335 | 13.3% |
| New Orleans, LA MSA | 1,337,726 | 1,285,270 | 52,456 | 4.1% |
| Pensacola, FL MSA | 412,153 | 344,406 | 67,747 | 19.7% |
| Tuscaloosa, AL MSA | 164,875 | 150,522 | 14,353 | 9.5% |
| **Total** | **13,095,938** | **10,664,655** | **2,431,283** | **22.8%** |
| Baton Rouge, LA MSA | 602,894 | 528,264 | 74,630 | 14.1% |
| **Total with Extension** | **13,698,832** | **11,192,919** | **2,505,913** | **22.4%** |

## Near-Term Improvement Plan

Currently each leg of the Gulf Coast Corridor has Amtrak long-distance train service with, for the most part, maximum authorized speeds of 79 mph. In the near-term the Gulf Coast states are moving forward with projects that would reduce delays and improve the reliability and operational safety of these services.

*Texas* has secured $125,000 in funds from the Federal Railroad Administration to inventory the highway-grade crossings along its 149-mile portion of the Gulf Coast Corridor.

*Louisiana* is planning a $648,000 relocation of the rail line at East City/Carrollton Junction, moving the junction 600 feet closer to the New Orleans Union Passenger Terminal and realigning a restricted curve. This minor modification of the track structure would permit timetable speeds in the area to be raised form the current 15 mph to 40 mph.

Additionally under consideration is extending the Pearl River siding, near Slidell, LA, one mile south at a cost of $1.7 million in order to provide 9,000 feet of standing room in the siding, not block two roads in the area, and permit trains to move into and out of the siding at higher speeds.

*Mississippi* is considering seeking federal funding for two siding projects. Barnet Siding (30 miles south of Meridian) would be extended 5,000 feet to allow trains entering and leaving the siding to do so at significantly higher speeds. Picayune Siding (145 miles south of Meridian) would be closed and a new 11,000 foot replacement siding constructed at Ozona Road to permit higher siding entry and exit speeds. The two siding projects would cost just under $5 million.

Mississippi DOT is conducting an Environmental Impact Study (EIS) on the effects of relocating the CSXT mainline that currently runs through Gulf Coast communities within blocks of the beach. The line, which has too many congested grade crossings for a safe rail operation, would be moved north of I-10, yet avoid a National Wildlife Refuge for the federally endangered Mississippi sandhill crane.

## Long-Term Improvement Plan

The Southern Rapid Rail Transit Commission, with the consulting team of Burk-Kleinpeter, Inc. and Parsons Transportation Group, are developing various track and signal upgrades, route realignments, and grade-crossing improvement projects that would incrementally over the next 7–20 years transform the Gulf Coast Corridor from a conventional speed, long-distance rail route into a high-speed corridor. Amtrak estimates the total cost for the necessary infrastructure construction and specialized trainsets would be approximately $4.6 billion.

# Northern New England Rail *Corridor*

The *Northern New England Rail* Corridor is among the most recently designated high-speed corridors. The corridor is comprised of a Boston hub (North Station) with spokes to Montreal, Canada and Portland/Lewiston–Auburn, ME. The Boston–Montreal line would travel along existing rail rights-of-way from Boston, north to Nashua, NH, and up through Manchester to Concord, then turns northwesterly following the former Boston and Maine, Northern Line from Concord to West Lebanon, NH. It crosses into Vermont at White River Junction and travels northwesterly to Montpelier, Burlington, and St. Albans, VT, linking with the Canadian National railroad at Alburg,VT. From Alburg, the line travels the final 65 miles to Central Station in Montreal, Quebec.

- Route Miles
  - 325 Boston to Montreal
  - 114 Boston to Portland
- Round-Trip Frequency
  - Four daily Boston to Portland
  - This is a new service, in existence since December 2001.
- Maximum Speed
  - Seventy-nine mph Boston to Portland

As the Maine–Portland segment of the corridor has been in existence for such a brief time, less than a full year, and as the Boston–Montreal segment of the corridor is not yet in use in its proposed configuration, ridership numbers are not available. Train speeds are an issue of much current concern in this corridor. Guilford Rail Systems, owner of the track over which the rail service will operate for much of the route, asserts that 60 mph is the maximum speed for safe operation. The FRA maintains that the track could accommodate speeds up to 79 mph. Track testing is underway to resolve the issue. A longer-term goal is to raise speeds above the 79-mph maximum.Vermont provides support for two trains, the *Vermonter* and the *Ethan Allen*. The *Vermonter* travels over much of the same route as the one proposed for this corridor. Together, these two trains provide two daily round-trips.[88] Combined ridership in FY 1996 was 75,000, rising strongly to 111,000 in FY 2001.

Assuming a 79-mph speed, the trip between Boston's North Station and Portland would take 2.5 hours. Maintaining the current speed restriction will add another 15 to 20 minutes to that travel time.

[88] Previously the *Ethan Allen* made an additional southbound trip operated without revenue passengers for equipment positioning and maintenance.

## *Context of the Corridor*

The principal objectives of High-Speed Rail Service are to reduce congestion associated with highway and air travel and provide an alternative mode of travel. In the Boston-to-Montreal corridor, alternative rail service could reduce growing traffic concerns in the Boston metropolitan area and the I-93 and Route 3 corridors in northern Massachusetts and New Hampshire. The High-Speed Rail service could also reduce growing traffic volumes for I-89 in Vermont and New Hampshire.

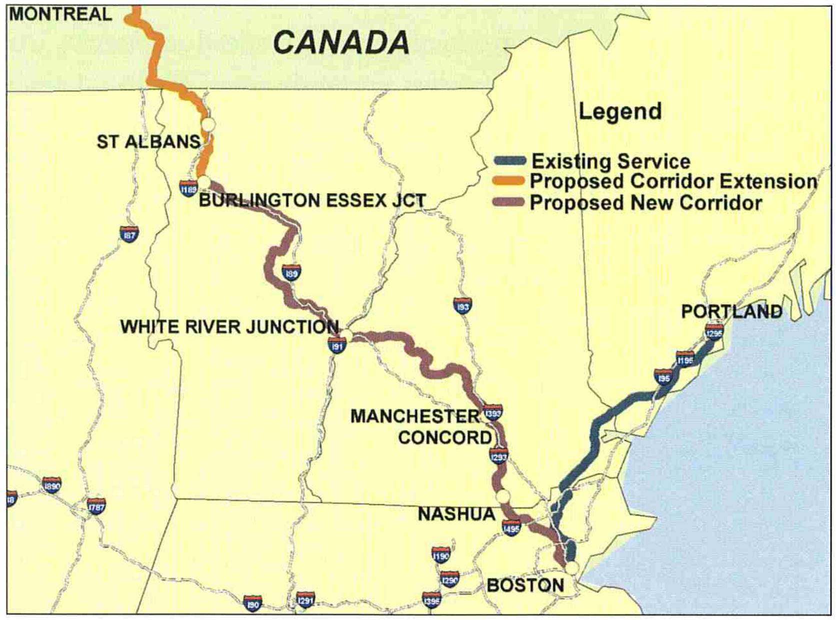


**Figure 32. The Northern New England Corridor**

The metropolitan population base for the United States portion of the Northern New England Corridor is among the smallest of all the rail corridors, just topping four million. Boston, alone, accounts for three quarters of this total. The corridor benefits from strong tourism ties between the large Boston economy and southern Maine's coastline, and from the corridor's connection to the Northeast Corridor to the south. The eventual extension of the corridor up to Montreal will increase this total population base.

### Table 63. Population Trends Along the Northern New England Corridor (U.S. Portion)

| | Census Population | | Change, 1990 to 2000 | |
|---|---|---|---|---|
| *Area* | *April 1, 2000* | *April 1, 1990* | *Number* | *Percent* |
| Boston, MA–NH PMSA | 3,406,829 | 3,227,707 | 179,122 | 5.5% |
| Burlington, VT MSA | 169,391 | 151,506 | 17,885 | 11.8% |
| Portland, ME MSA | 243,537 | 221,095 | 22,442 | 10.2% |
| **Total** | **3,819,757** | **3,600,308** | **219,449** | **6.1%** |
| Lewiston–Auburn, ME MSA | 90,830 | 93,679 | –2,849 | –3.0% |
| Manchester, NH PMSA | 198,378 | 173,783 | 24,595 | 14.2% |
| Nashua, NH PMSA | 190,949 | 168,233 | 22,716 | 13.5% |
| **Total with Extensions** | **4,299,914** | **4,036,003** | **263,911** | **6.5%** |

The introduction of high-speed rail service would provide an alternative travel mode for airline travelers currently using Boston–Logan International, Manchester International, Burlington International or Montreal–Dorval airports that could mitigate anticipated future air travel congestion.

### Near-Term Improvement Plan

Because the intervening time since the corridor's designation has been so brief, study and planning efforts are just getting underway. Even so, the introduction of high-speed rail in the Northeast will build on existing state passenger rail efforts. For example, rail service between Boston and Portland was just re-introduced in New England. New Hampshire's plans to extend commuter rail service from Lowell, MA, to Nashua, NH, would advance the development of the rail corridor. Vermont is undertaking strategic rail investment. Maine is studying alternatives for linking Portland to the Northeast Corridor. In addition, the state is considering proposals to extend service to communities further north such as Freeport, Brunswick, and Rockland. Traffic volumes on the interstate highways between Portland and Brunswick have grown to the point that the highway may have to be widened to six lanes. These capacity issues have triggered the search for alternative transportation options.

Maine and the federal government are investing to upgrade the track, signals, and bridges on 78 miles of freight rail track in New Hampshire and Maine. All rehabilitation work on the Boston-to-Portland corridor is complete, including the installation of all rail. All 23 public highway–railroad grade crossings have been improved.

Capital investment in Maine's rail system, to date, is about $54.8 million for equipment and infrastructure. This is only for the Portland-to-Boston corridor. Future expenditures also include extending existing service to Brunswick, ME, and to west to the Lewiston/Auburn and beyond. Near-term expenditures are estimated at $52 million, of which $25 million is for equipment. Longer term, Maine anticipates $95 million in investment 7 to 20 years out. Of this, $20 million would be for equipment purchases.

### Vision Improvement Plan

Completion of all the necessary studies to implement high-speed service in the three-state corridor. Amtrak estimates the total cost for the necessary infrastructure construction and specialized trainsets would be approximately $2.5 billion.

# South Central Rail *Corridor*

The *South Central Rail* Corridor connects metropolitan centers in Texas, Oklahoma, and Arkansas. Within the state of Texas, the corridor generally parallels Interstate 35 from San Antonio to Dallas–Ft. Worth, where it divides along two paths. One segment of the corridor follows I-35 from Dallas–Ft. Worth north to Oklahoma City, with an eastern extension to Tulsa. The other segment runs from Dallas–Ft. Worth to Little Rock along the existing route of Amtrak's *Texas Eagle*.

The current service in this corridor is comprised of one corridor train, the *Heartland Flyer*, which connects Dallas–Ft. Worth to Oklahoma City, and one long-distance train, the *Texas Eagle*.

### Table 64. Characteristics of the South Central Corridor

| Current Operations | Dallas/Ft. Worth –Tulsa | Dallas/Ft. Worth-Little Rock |
|---|---|---|
| **Route Miles** | 600 | 679 |
| **Round-Trip Frequency** | 1 daily (DFW-OKL) | 1 long-distance |
| **Corridor Train Ridership** | 0 in 1996; 58,000 in 2001 | N/A |
| **Maximum Speed** | 79 mph (75 in selected segments) | 79 mph (75 in selected segments) |

The state of Oklahoma currently funds the *Heartland Flyer* conventional corridor service that travels from Oklahoma City to Fort Worth. The state provides both capital and operating support. Combined state expenditures average $6 million per year. While Oklahoma has just completed a cost study to implement high-speed rail service between Oklahoma City and Tulsa, overall planning for the entire South Central corridor is not yet as advanced as in some other corridors in the United States. As a result, the projections provided here represent the best estimates to date, but should be considered preliminary. Moreover, they do not cover the full length of the corridor, but rather summarize what has been projected to date. Amtrak estimates the capital costs for the entire corridor to be $2.56 billion. The recent announcement of a large-scale rail and highway initiative in Texas introduces additional uncertainty into the corridor's long-range capital needs.


**Figure 33. The South Central Corridor**

## Table 65. Estimated Capital Expenditures in the South Central Corridor

| State | Investments to Date | Near-Term | Vision | Total |
|---|---|---|---|---|
| Arkansas | $1 million | $19 million | $21.5 million | $41.5 million |
| Oklahoma | $0.6 million | $801 million* | $35 million | $836 million |
| Texas | – | $475 million new track option<br>$250 million shared track option** | – | $250 million<br>to $475 + million |

* Assumes 150-mph scenario. Estimate is for Tulsa-Oklahoma City segment only.

** Estimates are for the 110-mile portion of the corridor from San Antonio to Georgetown.

### *Context of the Corridor*

The South Central Corridor is located in one of the fastest-growing regions of the United States Average population growth among the corridor's largest metro areas roughly doubled the United States pace. Several economies outpaced U.S. growth by an even larger margin. This rapid population growth, in addition to rapidly growing NAFTA trade flows along the region's highway corridors, has sparked intensified interest in transportation options.

### Table 66. Population Trends Along the South Central Corridor

| Area | Census Population | | Change, 1990 to 2000 | |
|---|---|---|---|---|
| | *April 1, 2000* | *April 1, 1990* | *Number* | *Percent* |
| Austin–San Marcos, TX MSA | 1,249,763 | 846,227 | 403,536 | 47.7% |
| Dallas, TX PMSA | 3,519,176 | 2,676,248 | 842,928 | 31.5% |
| Fort Worth–Arlington, TX PMSA | 1,702,625 | 1,361,034 | 341,591 | 25.1% |
| Killeen–Temple, TX MSA | 312,952 | 255,301 | 57,651 | 22.6% |
| Little Rock–North Little Rock, AR MSA | 583,845 | 513,117 | 70,728 | 13.8% |
| Longview–Marshall, TX MSA | 208,780 | 193,801 | 14,979 | 7.7% |
| Oklahoma City, OK MSA | 1,083,346 | 958,839 | 124,507 | 13.0% |
| San Antonio, TX MSA | 1,592,383 | 1,324,749 | 267,634 | 20.2% |
| Texarkana, TX–Texarkana, AR MSA | 129,749 | 120,132 | 9,617 | 8.0% |
| **Current Total** | **10,382,619** | **8,249,448** | **2,133,171** | **25.9%** |
| Tulsa, OK MSA | 803,235 | 708,954 | 94,281 | 13.3% |
| **Total with Extension** | **11,185,854** | **8,958,402** | **2,227,452** | **24.9%** |

## *Near-Term Improvement Plan*

Investments by the state of Arkansas are concentrated in signals and overpasses. State spending estimates do not include infrastructure or equipment investment. The state is considering a study to determine these needs within the Arkansas portion of the corridor. The Texas Department of Transportation is seeking funding to conduct feasibility studies for the South Central corridor located in its borders; while the infrastructure needs of some segments have been identified, the entire corridor has yet to be studied.

Oklahoma has $4 million programmed for signal upgrade improvements on the present *Heartland Flyer* route. The expectation is that these improvements will reduce travel time by 35 minutes. Additional improvements in the state of Texas would reduce the travel time by another 25 minutes.

Beyond improvements to the current system, the state of Oklahoma has just completed a High-Speed Passenger Rail cost study to move ahead in developing a high-speed rail service between Oklahoma City and Tulsa. The state's feasibility study, published in May 2001, resulted in a successful application for designation by the FRA and U.S. Department of Transportation as a High-Speed Rail Corridor from Ft. Worth to Tulsa.

Auto travel time between Oklahoma City and Tulsa requires that the operating speed over this segment range between 125 and 150 mph in order to be competitive in the corridor. Attaining such speeds is expected to require an $801 million investment for this segment alone.

## Vision Improvement Plan

Longer term, the state of Oklahoma intends to link the South Central corridor to the MWRRI network at Kansas City. The original cost projections for 110-mph service between Tulsa and Kansas City utilizing existing rail right-of-way was $254 million.

An additional objective is to connect Oklahoma's corridor with Denver. Preliminary cost estimates for extending the *Heartland Flyer* service from Oklahoma City are $35 million.

Amtrak estimates the total cost for the necessary infrastructure construction and specialized trainsets for the South Central Corridor would be approximately $2.56 billion.

## Colorado Corridor Vision

Denver, CO, is beginning the planning process to establish intercity rail along the Front Range and along the I-70 corridor. Colorado has experienced explosive population growth in the past decade and the demands of this population have outstripped the transportation infrastructure in places making highway congestion much more of a problem now than it was even 10 years ago. Excluding Pueblo, all other metro areas along the corridor grew by 30 percent or better, triggering a search for travel options.

**Table 67. Population Trends Along Colorado's Front Range Corridor**

| | Census Population | | Change, 1990 to 2000 | |
|---|---|---|---|---|
| *Area* | *April 1, 2000* | *April 1, 1990* | *Number* | *Percent* |
| Boulder–Longmont, CO PMSA | 291,288 | 225,339 | 65,949 | 29.3% |
| Colorado Springs, CO MSA | 516,929 | 397,014 | 119,915 | 30.2% |
| Denver, CO PMSA | 2,109,282 | 1,622,980 | 486,302 | 30.0% |
| Fort Collins–Loveland, CO MSA | 251,494 | 186,136 | 65,358 | 35.1% |
| Greeley, CO PMSA | 180,936 | 131,821 | 49,115 | 37.3% |
| Pueblo, CO MSA | 141,472 | 123,051 | 18,421 | 15.0% |
| **Total** | **3,491,401** | **2,686,341** | **805,060** | **30.0%** |

Still in the early planning stages, the 204-mile Front Range corridor would have standard passenger service; high-speed rail is not currently under consideration. Initial infrastructure estimates are $1.2 billion for the Front Range Corridor. There are no equipment cost estimates at this time.

In addition, Colorado is examining a number of transportation alternatives for the I-70 West Corridor from Denver to Vail–Eagle County Airport. Among the options under consideration, there are five rail alternatives, ranging in cost from $1.7 billion to $4.1 billion. Of these, the middle scenario is a double-track electric heavy rail option. Current estimates for this middle option are $1.6 billion for infrastructure and $1.2 billion for equipment.

## Long-Distance Train Profiles

The long-distance trains operated by Amtrak serve 40 states across the country, plus Washington, DC. Twenty-five of these states have no other rail service. The routes stretch from coast-to-coast, and from border-to-border, allowing for numerous national connections between both corridor and long-distance trains (see map in *Long-Distance Markets* section). Most long-distance trains are limited to speeds of 79 mph due to track and signaling conditions. There are areas of higher speeds on a few routes:

- Ninety mph on the *Southwest Chief* on certain segments between Kansas and Arizona.
- Up to 125 mph on the Northeast Corridor between Washington, DC, and New York City, depending on the cars and locomotives used.

### Table 68. Long-Distance Market Characteristics

| | FY 2001 | FY 1996 |
|---|---|---|
| **Number of Routes** | 17 | 19 |
| **Round- Trip Frequency**[89] | 15.9 | 14.4 |
| **Sum of Route Mileage**[90] | 24,700 | 25,100 |
| **Long-Distance Ridership** | 3,918,000 | 4,036,000 |

89 Average daily round trips. Some routes operate less than daily. In addition, in FY96 some routes operated daily over portions of the route, and less than daily over other portions. The frequencies on these routes were weighted for distance.

90 Route mileage is calculated by adding total one-way mileage for each route. Segments over which the same train contains cars from more than one route are only counted once.

Over the past five years, five long-distance routes that were less than daily over at least a portion of their route have been restored to daily service (most had operated daily before FY95 service cuts). In addition, two routes, the *Pioneer* and the *Desert Wind,* were eliminated and one route, the *Silver Palm,* re-established.[91] While the overall ridership on the long-distance trains has declined over the past five years, this is in part explained by the reduced capacity that has been operated on the routes. Amtrak management retired a number of its older passenger cars in the mid-1990s, and it also lacked the capital to repair numerous cars that had been removed from service.

Long-distance trains serve a basic transportation role in numerous corridors throughout the United States. Nearly all long-distance trains provide corridor service in more than one-corridor market, although time of day is clearly not optimal in every corridor. Coach travel is especially focused on these corridor markets. For example, on the *Coast Starlight,* the strongest coach segments are between Seattle, WA, and Eugene, OR, and between the Bay Area in northern California and Los Angeles, CA. Both of these segments are traversed in daylight, and in the case of the Pacific Northwest segment, supplements existing corridor service. Other examples include the trains between the Northeast and Florida, and trains like the *California Zephyr,* which serve a Chicago-to-Omaha corridor market, Denver to Salt Lake City, and Reno to the Bay Area. In these markets, long-distance coach train travel is primarily catering to the basic transportation needs of the passengers.

First-class service provided on long-distance trains attracts a different clientele, one that is either traveling overnight, or is looking for a transportation experience. The average first class passenger travels a significantly longer distance than those that travel in coach.

Long-distance trains have received significant capital investment through several purchases of cars and locomotives. Since the early 1990s, Amtrak has financed most purchases through capital leases. Prior to the 1990s, the federal government gave funds to Amtrak that were used for outright purchase of equipment. A small amount of capital has been invested in rail infrastructure and stations as well. However, most long-distance route miles are over freight railroad-owned track, and the largest station investments have been made at facilities that are also shared with corridor trains. Local communities and state governments have often built or improved their rail stations, with some limited matching funds from Amtrak.

The long-distance trains share the track in many places with freight and commuter trains. Some routes also benefit significantly from feeder buses, especially the New York to Florida services, the Chicago-to-East Coast services, the Chicago-to-San Francisco area *California Zephyr* and the Chicago-to-Los Angeles *Southwest Chief.*

91 The *Silver Palm* was previously known as the *Palmetto.*

Amtrak has carried out some detailed long-distance train planning in recent years, much of it focused on improving and expanding service. These plans are summarized in Amtrak's *Long-Term Capital Plan,* published in February 2001. In the near-term, much of the effort is focused on refurbishing and replacing equipment, as illustrated in the table below. In addition, Amtrak has developed a number of expanded service plans that it is considering. All of these plans are contingent on additional capital being available.

### Table 69. Long-Distance Fleet Needs Estimated by Amtrak[92]

| Time Period | Rebuilding | Replacement | Svc Expansion | Total |
|---|---|---|---|---|
| FY01–05 | $0.44 billion | $0.17 billion | $0.38 billion | $0.99 billion |
| FY06–20 | $0.03 billion | $0.02 billion | $0.06 billion | $0.11 billion |
| **Total** | **$0.48 billion** | **$0.18 billion** | **$0.44 billion** | **$1.10 billion** |

## *Detailed Description of Long-Distance Capital Spending*

As illustrated above, long-distance capital spending is largely focused on rebuilding and replacing the fleet. Very little of Amtrak's long-distance fleet refurbishment and replacement has been funded in the one year since the long-term capital plan was issued, with the exception of locomotive replacement. The plan assumes the following:

- Rebuilding of single-level and bi-level equipment used in long-distance passenger service. Much of the equipment is more than 20 years old, and would need to be retired without rebuilding.
- Replacement of a portion of the locomotive fleet. The diesel locomotives used on the intercity long-distance trains have been mostly replaced in the past year, allowing F40 locomotives at the end of their useful life to be retired. Additional replacement of some of the E60 electric locomotives is included in this plan as well.
- Additional equipment to provide a higher standard of service on long-distance trains. This equipment is envisioned as providing additional food service and lounge facilities that will allow Amtrak to provide a higher revenue-generating product on its trains.

In addition to spending on fleet, significant capital spending is planned for station improvements, improvements to maintenance facilities that serve long-distance trains and information technology expenses. While these areas of spending are not quantified to the same degree, the capital spending goals are as follows:

92 Excludes potential growth in mail and express equipment, as well as capital maintenance on equipment.

- Upgrade of stations that do not meet service and Americans with Disability Act standards.
- Modernization of major overhaul and preventive maintenance facilities.
- Additional investment in state-of-the-art information technology.

## The Alaska Railroad

Additional intercity rail service is also provided on the *Alaska Railroad,* owned by the state of Alaska since 1985. Approximately 500,000 passengers each year use the Alaska Railroad, which also generates significant freight tonnage. The railroad has 466 miles of main lines, as well as 59 miles of branch lines, stretching from south of Anchorage (Seward and Whittier) to the Fairbanks area. Passenger service is heavily weighted towards summer tourist travel, but year-round service is provided on the Anchorage-to-Fairbanks route.

Most visitors ride the rails during the summer months on one of two popular routes. The *Denali Star* operates daily each direction between Fairbanks, Denali Park, Talkeetna, and Anchorage, with a number of excellent chances to view Mt. McKinley. The entire trip between Anchorage and Fairbanks takes 12 hours traveling over 350 miles, and nearly everyone breaks the train trip up by overnighting in Denali Park or Talkeetna. The *Coastal Classic* connects Anchorage and Seward along a spectacular route featuring spectacular Turnagain Arm, jagged peaks, plummeting gorges and magnificent walls of ice. In 2000, the railroad added 16 state-of-the-art locomotives, nine custom-built passenger coaches and three vista dome-style coaches to our fleet. The railroad also hauls coaches owned by tourist lines.

Although it does not receive operating support from the federal government, more than $250 million of federal capital investment has been made since 1995. The data from this railroad is not included elsewhere in this report, and continuing capital investments are not included.

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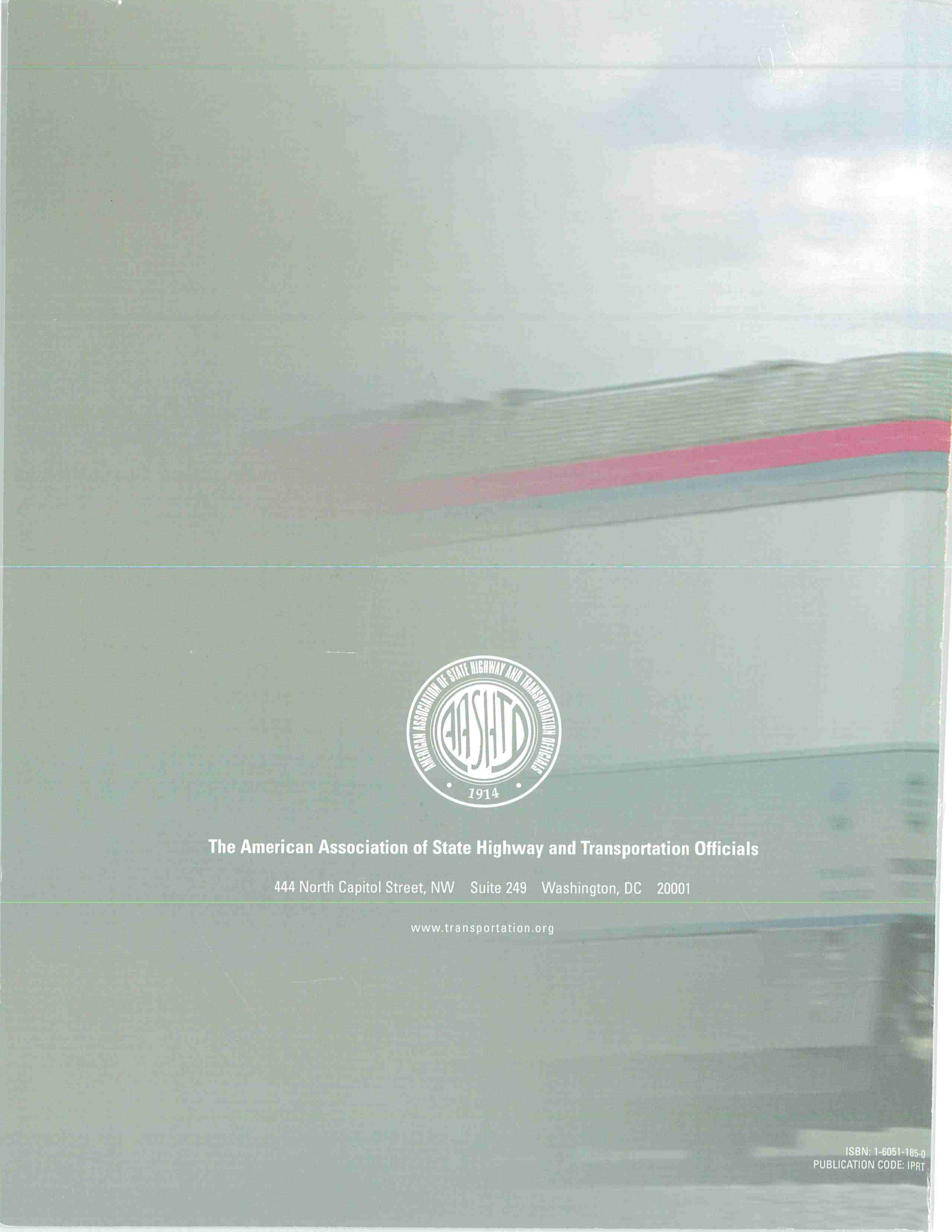

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